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ABSTRACT

The study examined differences between 57 learning disabled (LD) and 24 non-LD college students on measures of psychoeducational assessment. In addition, differences between LD students with good and poor academic performance were studied, and coping strategies were identified for both sub-groups. A variety of standardized tests were administered and information was gathered about coping strategies and barriers to learning through an individually administered interview, informal assessment of work products, and data about students' use of time. Results of the psychoeducational assessments identified key variables distinguishing LD from non-LD Ss; sequencing and timed tasks; language abilities; and spelling, math, and reading achievement. LD Ss also exhibited a wider range of subtest scatters but verbal conceptual abilities on the Wechsler Adult Intelligence Scale were equal to control Ss'. LD Ss with the highest academic performance performed significantly higher than lowest performance LD Ss on 36 to 39 psychoeducational variables. LD Ss with highest academic performance had the best scores (compared with low performance LD and control Ss) on six variables measuring verbal conceptual ability. Among other findings were that LD Ss used university resources more than controls; that LD Ss reported greatest difficulty in performing in-class exams and papers, with the most difficulties in grammar, spelling, and neatness rather than in ideas and concepts; and that a wide range of problem areas and coping strategies were identified. Appendixes include an interview format, a time log, rating sheets, and statistical information. (CL)

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# "Learning Styles, Learning Abilities and Learning Problems in College: An Exploration of Learning Disabilities in College Students"

Final Report of U.S. Department of Education
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# CHAPTER I

## INTRODUCTION

The college student with learning problems and possible learning disabilities poses a unique challenge to higher education. Unlike more visible populations of exceptional students, such as the blind or the orthopedically handicapped, college students with learning problems and learning disabilities are not easily differentiated from their non-handicapped peers and often do not receive the attention and aid that problems mandate (Ansara, 1971; Marsh, Gearheart & Gearheart, 1978). College students with learning difficulties caused by underlying deficits are "success stories," because in spite of learning problems, they have graduated high school and have been admitted to college.

> A great many mildly handicapped (by learning disabilities) young people have attended college. One can assume that college entrance, selection of subject matter, and other flexible approaches to learning disabilities will become increasingly common in our colleges as understanding of this disability becomes more widespread (Kronick, 1970, p. 18).

Kronick's statement applies to the current situation at Clark University. The author began working with undergraduates with learning disabilities and learning problems during 1979. Dr. Maida Follini, a visiting lecturer in the Education Department, and the author served as resource persons for undergraduates at Clark experiencing learning problems. As more students became aware of the services provided, more students surfaced. The pamphlet, "The Learning Disabled Student at Clark University," was created to better coordinate services for students experiencing learning problems.

The author is actively involved with a dozen undergraduates with learning problems; other students make contact on a less regular basis. The author has consulted with the Dean of Students and faculty members concerning specific students in an attempt to discover alternative stategies for students experiencing learning problems.

Interest in college students with learning disabilities is increasing. The Association for Children with Learning Disabilities (ACLD) recently voted to change its name to the Association for Children and Adults with Learning Disabilities in recognition that problems of learning disabilities do not magically disappear with childhood. ACLD also instituted a post-secondary strand devoted to issues of learning disabilities at that level. At the recent national conference of ACLD and the Orton Society, another professional organization devoted to dissemination of research and practice in the field of learning disabilities, sessions on college students with learning disabilities and adults with learning disabilities have been presented. The author has done several presentations at Massachusetts and Connecticut State special education association meetings on the topic of college students with learning disabilities, one by invitation, also indicating interest in this topic.

## Programming for College Students with Learning Disabilities

An interest in the problems of adolescents and adults with learning disabilities has grown in recent years, some colleges and universities have attempted to address the needs of their learning disabled students.

There are three identified administrative arrangements by which some colleges and universities have attempted to meet the special needs of learning disabled students:

1. Special programs designed specifically for college students with learning disabilities
2. Academic assistance centers which aid a broad range of students with learning probems and include specialized service for the learning disabled college student
3. Demonstration projects of a short-term nature which explore issues and methods of helping learning disabled college students.

There exist a small number of colleges and universities offering special programs for college students with learning disabilities. They include Curry College, Milton, Massachusetts; College of the Ozarks, Clarksville, Arkansas; Kingsborough Community College, Brooklyn, New York; Ventura Community College, California; Barat College, Lake Forest, Illinois; Southern Illinois University, Carbondale, Illinois.

New programs are coming into being. Adelphi University, Garden City, New York, began a Pilot Program for Learning Disabled College Students in September, 1979. These special programs admit students according to their own specified criteria, which often differ from regular admissions standards. At the Curtis Blake Replication Conference, April 4, 1979, Dr. Gertrude Webb stressed that Curry College's Program of Assistance in Learning (PAL) has the privilege of taking the students it wants for the program. The Curry College program began as a pilot program in 1970 with four students and now serves 100 undergraduates. Curry College uses the Wechsler Adult Intelligence Scale as a screening instrument for high abstract thinking ability. The learning disabled students in special college programs for them are selected according to certain specifications and are not necessarily representative of all college students with learning disabilities.

In addition to the small number of colleges and universities offering special programs for learning disabled students, many colleges and universities have learning centers, academic assistance centers, or whatever title is used, to aid students experiencing academic difficulties. Services for learning disabled students may be provided under the rubric of such learning centers. Allegheny Community College, in Pittsburgh, Pennsylvania, has such an arrangement. In a learning center which services 500 students per semester 30 are identified as learning disabled and received specialized services (Herbert & Czierniewski, 1976).

Many schools which do not have formalized learning disabilities programs attempt to meet the needs of learning disabled students through the support services available on campus. The brochure, "The Learning Disabled Student at Clark University" reflects an attempt to coordinate existing student support services to aid learning disabled students on the Clark University campus.

A third type of programming for learning disabled students has been offered on a special project basis. A demonstration project at three Minnesota Community Colleges (Ugland & Duane, 1976) was one such project which served 187 students with learning disabilities during a two-year period. Colorado State University, Ft. Collins, Colorado (Miller, McKinley & Ryan, 1979) conducted a six-month pilot program for its learning disabled students during the 1978-79 school year and has a task force exploring the problems of learning disabled students.

There is clearly a lack of services for learning disabled students at the college level. The paucity of special programs, and services designed to LD college students indicate that most LD college students attended college without formal programs designed for them. In the current special education vernacular, these college students with learning disabilities are mainstreamed. But, unlike younger students with learning disabilities, who, if identified as LD, are protected by federal and state legislation and receive services mandated in their individualized educational plans, college students with learning disabilities are on their own and may not be visilbe on campus. They form a hidden population. Learning disabled college students may come to the attention of certain faculty, academic advisors, or personnel in various student assistance centers, or there may not be anyone on campus aware of their learning disabilities.

A Brighter Future (1980), a federally funded project providing occupational information to meet special needs, lists four Massachusetts colleges which have formal programs specifically designed for learning disabled students. These four are Curry College, American International College, Salem State College, and Bradford College. None of these are considered to be "very selective" by the Comparative Guide to American Colleges (Cass & Burnbaum, 1977). A Brighter Future lists six colleges and universities in Massachusetts which identify themselves as making some provisions for learning disabled students, but do not have formal programs for LD students. Harvard University is the only college or university listed which falls into the very selective or higher ranking.

The author, in a thorough search of the literature, has not found any information about learning disabled students attending selective colleges or universities. The descriptions of the programs and services in the literature, mostly at two-year and less selective institutions, dwell on the services provided, diagnostic batteries utilized, types of personnel employed, and managerial considerations. The author has not found a systematic comparison of learning disabled and non-learning disabled college students. There are a few case studies offered of college students with learning disabilities, but none of the literature deals with programs or students with learning disabilities at selective, four-year colleges and universities. Therefore, this research proposed to study, in depth, a number of learning disabled college students at a very selective, four-year liberal arts university without a special program to meet their needs. These students were admitted to Clark University on the basis of their abilities, not as "special" students.

The research had several purposes. The first goal was the identification of the nature and determinants of learning problems for students at Clark University.

Secondly, the research identified successful coping strategies developed by college students with learning problems.

The research then identified areas in which college students with learning difficulties are blocked in efforts to learn.

## Definition of Learning Disabilities

The field of learning disabilities is plagued with difficulties around the areas of definition of learning disabilities and identification of students as learning disabled (Hallahan & Cruickshank, 1973; Kirk & Gallagher, 1979; Mann, Goodman & Wiederholt, 1978). The proper definition of learning disabilities for school-age children is in dispute; it thus becomes almost impossible to adequately define learning disabilities at the college level. The students chosen for this study will not strictly adhere to any definition of learning disabilities. Rather, the theory and research available from the field of learning disabilities will serve as background guiding this study. The main interest and intent of the research is an exploration of the broad area of learning differences and difficulties experienced by college students.

The term learning disabilities dates back to April 6, 1963. On that date, Samuel Kirk, speaking at a conference sponsored by the Fund for Perceptually Handicapped Children, Inc., made the following statements:

> Recently I have used the term "learning disabilities" to describe a group of children who have disorders in development of language, speech, reading and associated communication skills needed for social interaction. In this group, I do not include children who have sensory handicaps such as blindness or deafness because we have methods of managing and

> training the deaf and blind. I also exclude from this group children who have generalized mental retardation. (Kirk, 1972, p. 7)

His suggestion of the term learning disabilities was greeted enthusiastically. His speech served as a catalyst for existing interest in the field, and it delineated the general characteristics of a population known as learning disabled. The basic tenets espoused by Kirk in 1963 are part of most currently used definitions of learning disabilities.

The most widely used definition of learning disabilities is the one offered by the U.S. Office of Education and is used in the Education for all Handicapped Children Act, PL 94-142. This definition states:

> Children with specific 'learning disabilities' exhibit a disorder in one or more of the basic psychological processes involved in understanding or in using spoken or written language. Those may be manifested in disorders of listening, thinking, talking, reading, writing, spelling or arithmetic. They include conditions which have been referred to as perceptual handicapped, brain injury, minimal brain dysfunctions, dyslexia, developmental aphasia, etc. They do not include learning problems due primarily to visual, hearing, or motor handicaps, to mental retardation, emotional disturbance, or to environmental handicap. (National Advisory Committee on Handicapped Children, 1968)

However, as many authors have indicated, there is little agreement among professionals upon criteria for identifying children with learning disabilities (Hobbs, 1975; Mann, Goodman and Wiederholt, 1978. The U.S. Office of Education definition of learning disabilities and those proposed by Bateman (1964), Lerner (1971), Myklebust (1963) and de Hirsch, Jansky and Langford (1966), have been criticized as being too vague. In a review of the various definitions given for specific learning disabilities, Kirk and Gallagher (1979) state:

> There appear to be three criteria or factors that must exist before we can decide that a child has a specific learning disability. They are (1) a discrepancy between abilities or between potential and achievement (2) an exclusion factor, and (3) a special education criterion. (p. 284)

From their criteria, they formulate the following definitions:

> A special learning disability is a psychological or neutrological impediment to spoken or written language or perceptual, cognitive, or motor behavior. The impediment is (1) manifested by discrepancies among specific behaviors and achivements or between evidenced ability and academic achievement, (2) is of such a nature and extent that the child does not learn by the instructional method and materials appropriate for the majority of children and requires specialized procedures for development, and (3) is not primarily due to serve mental retardation, sensory handicaps, emotional problems, or lack of opportunity to learn. (p. 283)

The Kirk and Gallagher definition was used as a guideline for this research. The researcher was interested in students:

1. who have marked discrepancies among specific learning abilities or between overall ability and achievement.
2. who must utilize unique methods to learn,

methods which they have developed themselves or are used by those teaching them.
3. whose learning differences are not due primarily to sensory handicaps or emotional disturbance.

## Historical Background

A brief discussion of the history of the field of learning disabilities, the legislation affecting programs for students with learning disabilities and the development of programs for learning disabled children is important background for the proposed study of college students with learning problems. The term learning disabilities is an educational one but is derived from the fields of neurology, psychology, speech pathology, opthalmology, and remedial reading (Kirk & Gallagher, 1979, p. 285). The history of the field of learning disabilities is given in many introductory texts in the field. Wiederholt (1974) divides the development of the field of learning disabilities into three developmental phases: the foundations period, 1802-1926, the transition period, 1926-1963, and the integration phase, 1963 to present. In the foundation period, medical professionals identified severe problems. During the transition phase, psychologists and educators studied behavioral characteristics. The integration phase brought the beginning of educational intervention of learning disabled populations.

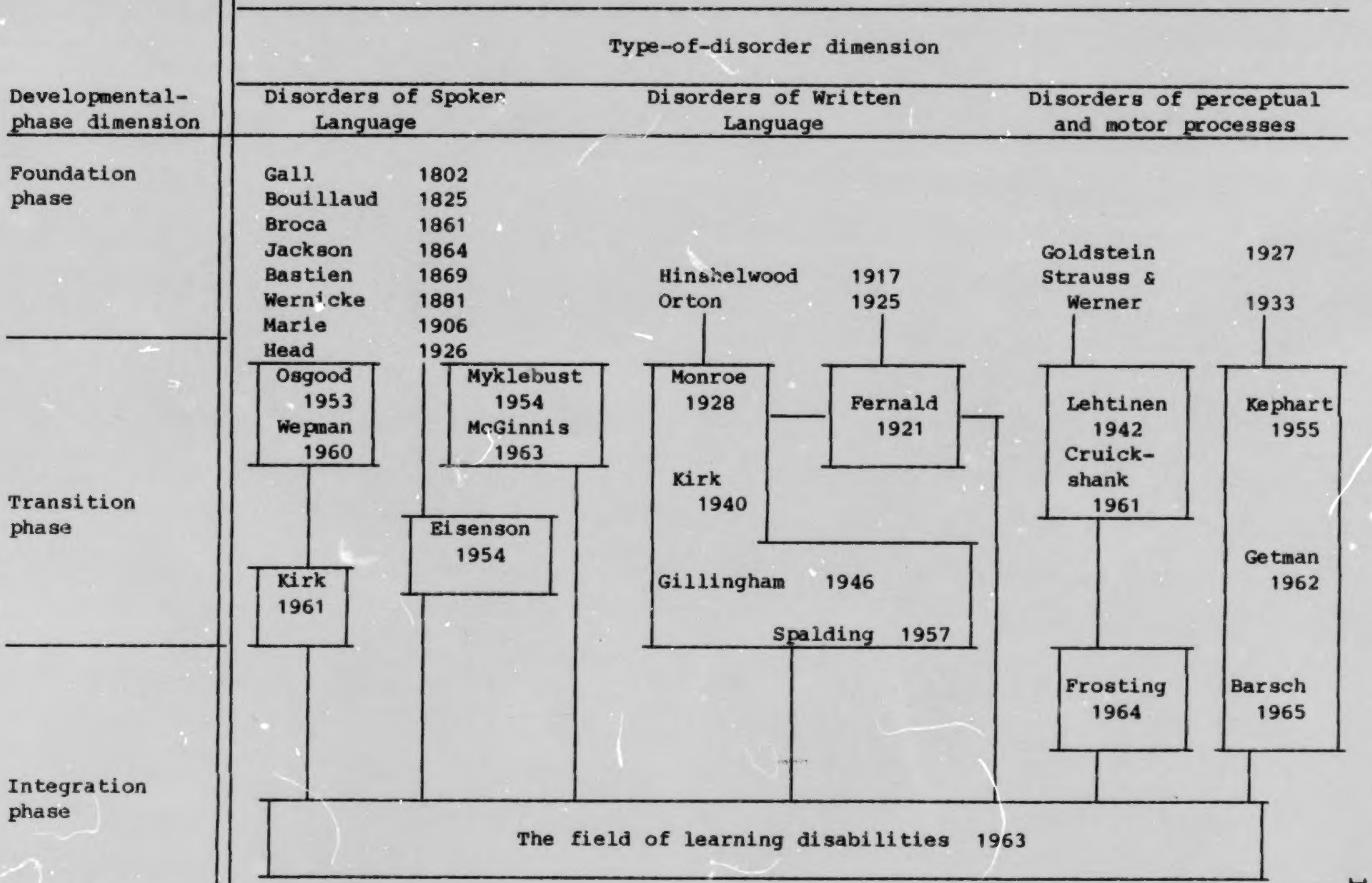
Wiederholt describes three major strands of the learning disabilities field, disorders of spoken language, disorders of written language, and disorders of perceptual and motor behaviors. He constructs a chart to illustrate the development of the field by phases and types of disorders, as given in Figure 1.

Hallahan and Cruickshank (1973) give a detailed historical perspective of the field of learning disabilities (pp. 58-131). They state that Strauss and Werner were the "investigative pioneers" in the field and that their early perceptual-motor studies provided the foundation of the field (p. 61-64). Much of Werner and Strauss' work was based upon Werner's tenet that analysis of mental processes underlying test scores was important in understanding both normal and deviant development in children (Werner, 1937). The theoretical position favoring analysis of processes underlying task results is one rationale for the methodology of the proposed study.

The various theorists in each dimension given by Wiederholt are discussed in later sections of the proposal. It has been only within the past decade that programs for learning disabled children have been instituted.

Three task force reports, funded by the National Society for Crippled Children and Adults and by the National Institute of Neurological Diseases and Blindness were instrumental in bringing together information from the various disciplines im-

FIGURE 1


Type-of-disorder dimension
Developmental-phase dimension
Disorders of Spoken Language
Disorders of Written Language
Disorders of perceptual and motor processes
Foundation phase
Gall 1802
Bouillaud 1825
Broca 1861
Jackson 1864
Bastien 1869
Wernicke 1881
Marie 1906
Head 1926
Hinshelwood 1917
Orton 1925
Goldstein 1927
Strauss & Werner 1933
Transition phase
Osgood 1953
Wepman 1960
Myklebust 1954
McGinnis 1963
Eisenson 1954
Kirk 1961
Monroe 1928
Kirk 1940
Fernald 1921
Gillingham 1946
Spalding 1957
Lehtinen 1942
Cruickshank 1961
Kephart 1955
Getman 1962
Frosting 1964
Barsch 1965
Integration phase
The field of learning disabilities 1963

(Wiederholt, 1974, p. 105).

pacting upon the learning disabilities field. The report of Task force I (Clements, 1966) dealt with terminology and identification in the field of learning disabilities. The Task Force II report, published in 1969, addressed identification, assessment, and evaluation procedures, educational programs, administrative procedures, professional preparation, and legislation (Haring & Miller, 1969). Task Force III reviewed research on central processing dysfunctions in children in relation to sensory information processing and dysfunctions in symbolic operations (Chalfant & Schefelin, 1969). These three task forces, along with individual and organizational pressure, fostered legislative action.

## Legislation Affecting Programming for Learning Disabled Students

The Rehabilitation Act of 1973, PL 93-112, Section 504, prohibits discrimination on the basis of handicap against persons in programs and activities receiving or benefitting from federal assistance. Efforts to remove architectual barriers for mobility-impaired students have resulted from this legislation and are the most widely recognized aspects of Section 504. The definition of physical or mental impairment included in Section 504 includes "specific learning disabilities." The law requires that students with learning disabilities must be provided with equal opportunity to benefit from educational programs and services (Miller, McKinley & Ryan, 1979). This act has far-reaching implications for higher education. While court decisions and regulations to this date are scant, the wording of Section 504 clearly instructs institutions of higher education to make provisions for handicapped students, including learning disabled ones.

A specific piece of legislation dealing with learning disabilities was the Children with Learning Disabilities Act of 1969, PL 91-230, the Elementary and Secondary Amendment of 1969. It mandated the Federal government to "facilitate the development of the field of learning disabilities within special education" (Bryan & Bryan, 1975, p. 9). This act led to research, surveys, demonstration programs and professional training for personnel to serve all learning disabled children. PL 91-230 incorporates the U.S. Office of Education definition of learning disabilities.

In 1975, the Education for All Handicapped Children Act, PL 94-142, was signed into law. Its purpose was to insure equality of educational services for students with handicaps. The Act includes the phrase "children with specific learning disabilities" in its definition of handicapped children.

With the advent of PL 94-142 and various state legislation, such as Massachusetts Chapter 766, public school programs for school aged children with learning disabilities have mushroomed. However, these programs have developed from the bottom up. Educators have focused upon early identification and intervention for children with learning disabilities. Services within school systems have usually been offered first in the primary grades (Webb, 1974; Weiss & Weiss, 1979).

Programs for young children with learning disabilities have been established at a phenomenal rate, faster than in any other area of exceptionality (Hallahan & Cruickshank, 1973). This was partially due to the belief that handicapped children who are identified early and are given appropriate help will outgrow or overcome their disabilities. Programs for secondary students with learning disabilities have become a common phenomenon only in the last five years (Zigmond, 1978; Mann, Goodman & Wiederholt, 1978; Jordan, 1978).

## College Students with Learning Disabilities

The plight of college students with learning disabilities has received little attention. A 1976 survey of 327 four-year colleges and universities in the United States showed that 109 colleges and universities recognized that there are students with learning problems on campus (Gelo, 1976). Yet only fifteen percent of those colleges or universities altered curriculum or provided tutoring and/or learning aids. A National Directory of Four-Year Colleges, Two-Year Colleges and Post-High School Training Programs for Young People with Learning

Disabilities (Fielding, 1975), is a reference source of post-secondary programs for learning disabled students. Investigation of the listed educational and training institutions showed that they admit learning disabled students, but only fifteen percent provide special services by specially trained staff (Marsh, Gearheart & Gearheart, 1978, p. 225).

Rawson (1966) in a rare longitudinal study of dyslexic and non-dyslexic boys tested the hypothesis that "dyslexic students, diagnosed between the ages of six and twelve, necessarily have poorer prospects for success in later educational and vocational achievement than do non-dyslexic students" (p. 165). She studied all the boys who had been enrolled in a private school for at least three grades during the years 1930-1947. Fifty-six boys met this attendance criterion, and all were studied. All the boys graduated from high school and all, language disabled and normal, had further schooling. Rawson's hypothesis was not supported. The low-language facility boys achieved as well as the non-language disabled group. In the low-language group, several had attained B.A.'s, five had one year of graduate work, five had master's, and five had received doctorates. The study did find, however, that many members of the languge-disabled group, as adults, still experienced difficulties with slow reading and poor spelling. These learning-disabled boys all attended colleges and universities which did not have special programs for them.

Although literature on college students with learning disabilities is scant, this particular group of LD students is particularly suited for research areas which could contribute valuable knowledge to the field.

According to Piagetian theory, the age of 14 brings the period of formal operations. Elkind (1974) explains that children's thought operates on two levels, assumptions and facts. Only in adolescence is the ability to distinguish between hypothesis and reality developed.

> With formal operations, the young person can conceptualize his own thought and discover the arbitariness of his hypothesis. This leads to a recognition that many of his hypotheses are wrong and gives him a new respect for data and a diminished confidence in his own ability. He then begins to be self-critical, so that cognitive conceit is gradually given up. The passing of cognitive conceit is hastened as the adolescent attempts adult tasks (work) and begins to measure himself by adult standards. (p. 64)

With the advent of the formal operations period, adolescents are able to be introspective and reflect upon their own mental and personality traits (p. 76).

The adolescent period is one in which the developmental task is identity (Erikson, 1963, pp. 261-263). A characteristic of adolescent thought is the ability to construct ideals and conceptualize the future as a reality which must be addressed. The adolescent must forge an identity and project it into the future. Therefore, the power of introspection and the tendency for adolescents to become self-critical as they measure themselves against their ideals may make the effects of a learning disability different during the college years than at earlier periods. As college students seek to develop adult identities and plan for the future, they must deal with their own differences.

> Even a disabled child needs to have a feeling that he knows what is happening to him and why...How much more true this is of the person who has reached adulthood with all the independence of judgment and self-determination that this implies. (Wright, 1960, p. 346)

College students with learning problems are able to add information about learning problems from their own perspectives, something younger children cannot easily do, as well as demonstrate how learning difficulties influence functioning at this stage of development. Therefore, in addition to test data, an interview is a valuable source for understanding the learning disabled student.

Psychoeducational assessment instruments may pinpoint specific areas of strengths and weakenesses and indicate achievement levels. However, the primary goal of this study delineates the important factors influencing the college student with learning difficulties and differences. The student himself is able to provide a perspective different from even the most skilled diagnostician, the perspective of "insider."

The interview in this study connected the student and his/her current experience in college with earlier events, problems, and solutions. The interview also provided a complementary perspective to the psychoeducational assessment.

At a recent national meeting of the Association for Children with Learning Disabilities, Clements (1981) stressed that adults with learning disabilities may aid in their own remediation and case management because of their abilities to reflect back on their own experiences. The interview schedule in this study was central to the exploration of college students with learning problems.

# CHAPTER II

## SELECTIVE REVIEW OF PERTINENT LITERATURE

### Areas of Assessment of Learning Disabilities

The areas of assessment for learning disabled children traditionally have been intelligence, visual-motor-perceptual development, languages development, academic achievement (including reading, writing, spelling and mathematics), and social-emotional development (McCarthy & McCarthy, 1969, pp. 20-22; Lerner, 1971, Chapter 4). One survey of Child Service Demonstration Centers for learning disabilities (Thurlow & Ysseldyke, 1979) showed that the *Wechsler Intelligence Scale for Children* was the only assessment instrument used by all of them. Therefore, at least according to the body of literature available, there are no specific tests or assessment procedures which must be included in a learning disabilities assessment battery.

Using the categories of intelligence, perceptual development, language developmnt and academic achievement as guides, the literature about assessment of learning disabled children will be discussed, with special emphasis on adolescents with learning disabilities. Characteristics of adolescents with learning disabilities will be reviewed in each of the four categories.

## Intellectual Ability

Assessment of ability or intellectual functioning is an essential component of a psychoeducational evaluation. By definition, children with learning disabilities possess at least average intellectual ability. Therefore, an intelligence test is used first to ascertain if a child with a suspected learning disability does possess average intellectual ability. The discrepancy between intelligence and achievement is "a benchmark of learning disabilities" (McCarthy & McCarthy, 1969, p. 21). For assessment of intellectual functioning, tests which yield several subtest scores, such as the Wechsler scales, are preferred because the discrepancy among subtests scores may indicate further testing and possible areas of remediation.

Therefore, the second way intelligence tests are used in the assessment of learning disabilities is for analysis of scatter. Rapaport, Gill and Schafer (1968), in discussing scatter and the Wechsler Adult Intelligence Scale, state that "variations in patterning of abilities ought to yield diagnostically and personologically relevant information" (p. 161) but that "psychometric considerations" limit the usefulness of pattern analysis. They caution that the subtest scores and patterns on the WAIS will prove valuable if they are not taken too seriously but are used as sources for hypotheses. Salvia and Ysseldyke (1978, p. 410) also cite difficulties in using profiling.

## Perceptual-Motor Development

The group of educators emphasizing perceptual motor aspects of learning disabilities has been a strong one in the field. Their orientation is developmentalistic (Myers & Hammill, 1969), and based upon the work of Piaget and Inhelder (1969) and Werner (1937), Werner gave the three stages of learning as motor, perceptual, and conceptual, with each higher stage growing out of the one preceding it. Piaget discovered that motor learning preceded conceptualization, and commented that motor learning continues to show itself into adult life. Several theories within the learning disabilities field, the visuomotor theory (Getman, 1962), the movigenic theory (Barsch, 1967), the perceptual motor-theory (Kephart, 1963), and the patterning theory of neurological organization (Delacato, 1966) state that deficient sensory-motor or perceptual-motor development is the cause of learning problems and that these must be remediated.

The efficacy of perceptual-motor training to remediate learning disabilities is currently in disregard (Balow, 1971; Bortner, 1974). Researchers concur that many children with learning disabilities do exhibit deficient perceptual-motor functioning; the accuracy of identifying children as learning disabled by perceptual-motor assessment is in question along with the effectiveness of remediation using perceptual motor strategies (Hammill, Goodman & Wiederholt, 1974).

"Research specifically relating to perceptual and motor disability in second learning-disabled populations is negligible..." (Deshler, 1978, p. 65). Much information in this area, therefore, is from clinical and classroom observation. Perceptual-motor manifestations of learning disabilities in older students may include hyperactivity, distractibility, poor attention span, incoordination and perceptual irregularities. These manifestations may be less severe than in elementary-aged students with learning disabilities. However, perceptual and motor factors may still affect adolescents with learning disabilities.

Adolescents who are hyperactives show subtler actions, such as tapping, tics, and grimacing, than younger LD students (Wilcox, 1970). As students grow older, attention span improves; however, LD secondary students may still have sufficient attention for long class periods and lectures. Concentration may be affected by others and environmental noises, posing problems in completing assignments at home and in school. Furthermore, the secondary classroom often offers restricted opportunities for movement, preventing outlets for motor behavior that were present in elementary classrooms.

A part of the research explored the perceptual-motor characteristics of college students with learning problems.

The interview contributed data about how these students perceive their own adequacy in this area.

## Lanaguage Development

As noted in the earlier section on historical background of the learning disabilities field, language development has always been an important area of concern in learning disabilities. The U.S. Office of Education definition of learning disabilities, the one most frequently cited and used in the field, defines specific learning disabilities as disorders in psychological processes involved in understanding or in using language. Thus, language development is a critical area in the study of learning disabilities.

Orton (1937) studied language problems and developed remedial methods to deal with languaged-based learning disabilities. Kirk, McCarthy & Kirk, (1961) used a language-development model in constructing the Illinois Test of Psycholinguistic Abilities, a widely used assessment for language disabilities. Wepman's language development model led to a test for aphasia (Wepman & Jones, 1961). Fernald (1943), Kirk (1966), and Gillingham (1936) as well as Myklebust (1965) investigated written language problems and their remediation.

Research in this area of language difficulties of learning disabilities adolescents has shown them to lack abilities of non-handicapped peers. Semel & Wiig (1976) conducted a series of studies investigating language abilities in learning disabled adolescents. They concluded that productive language deficits associated with learning disabilities may persist into adolescence and may be related to earlier observed problems in language processing. Myklebust (1965) used the *Picture Language Story Test* to study the difficulties learning disabled students have with written language. Hammill, Brown, Larsen & Wiederholt (1980) found that the *Test of Adolescent Language* (TOAL) was effective in discriminating the learning disabled adolescents from non-handicapped and mentally retarded adolescents, and that learning disabled adolescents were significantly deficient in all areas of language tested. A review of the literature on language characteristics adolescent learning disabled students by Sitko & Gillespie (1978) revealed that many language strategies exhibited by learning disabled adolescents are deficient (p. 151). One aspect of the present study will be an exploration of the language abilities and deficits of college students with learning problems.

### Achievement

Tests of academic achievement are included in assessment of learning disabilities. Discrepancy between academic achievement and ability may or may not be a factor in the study of college students with learning disabilities have been chosen as a group for study is the belief that they have developed coping strategies to deal with academic work. If they have developed compensatory techniques, some college students may not evidence lags in academic achievement. However, low academic achievement may be a factor for some college students with learning disabilities.

## Questions Related to the Hypotheses

This section will address the questions related to the specific concerns of th study. The rationale for choosing these questions will be supported from the literature. Then, hypotheses generated from the literature will be presented.

### Area I - The nature and determinants of learning disabilities in college students.

Q. 1. How do college students with learning disabilities perform on psychoeducational assessments?

Q. 2. What was the past background of college students with learning disabilities?

Q. 3. What is the college experience like for college students with learning disabilities?

There is little in the literature about college students with learning disabilities and virtually no description of college students with learning disabilities matriculating at competitive colleges and universities. Most of the descriptions of learning disabilities found in the literature are of children and there is now a growing body of information found on adolescents.

In their book on the learning disabled adolescent, Goodman, Mann and Wiederholt (1978) state that "determining relevant psychoeducational characteristics of learning disabled secondary students is most important" (p. 296). They go on:

> There remains a critical need to delve into the social, emotional, cognitive and educational character of learning disabled teenagers. We need to know in which, if any, ways they differ from their non-handicapped peers. We need to know if there are common qualities that recur among learning disabled youths. We need to know which characteristics are significant to their educational needs and problems...
>
> Basic research should focus on both the learner and the learning environment...We need to study secondary-level learning disabled pupils individually and interactively. For the individual, what psychoeducational profile and personological traits have significant bearings on his or her school performance? (p. 296)

Their advice is quite apropos to study of the college student with learning disabilities. Before remediation efforts and program planning efforts are put into motion, it is critical to learn the characteristics of the college student with learning disabilities. Therefore, a major part of the research dealt with psychoeducational assessment of the study population.

Marsh, Gearheart & Gearheart (1978) state that "...despite the fact that there is little research relating to adolescents with learning disabilities," there are three main views held by professionals in viewing adolescents with learning disabilities. These three points of view are:

1. Many adolescents overcome learning disabilities that were present in earlier years. Improvement may be the result of maturation of the central nervous system.
2. LD adolescents possess symptoms of learning disabilities recognized in childhood, and that many characteristics of learning disabilities remain at maturity.
3. Learning disabilities may actually begin during adolescence. (p. 20)

These authors emphasize the lack of research. How learning disabilities stay the same or become altered over the years has not been investigated. Meyer and Lehr (1980) state that most LD students continue to have problems in learning as adolescents (p. 21). They argue, furthermore, that use of coping skills may prevent potentially helpful remediation being taught.

The changing demands of school settings may be a critical variable in the emergence, existence, and severity of a learning disability in adolescence (Marsh, Gearheart & Gearheart, 1978). The type of school, subject matter studied, mode of presentation and required responses, and type of extra assistance available may all affect the functioning of students with learning disabilities. Therefore, the past backgrounds and learning experiences of college students with learning disabilities were studied as well as the current college experience. College students with learning problems are able to add information about learning problems from their own perspectives, something younger children cannot do, as well as demonstrate how learning diffculties influence functioning at the college level. At a recent national meeting of the Association for Children with Learning Disabilities, Clements (1981) stressed that adults with learning disabilities may aid in their own remediation and case management because of their abilities to reflect back on their own experiences. The interview schedule used in this study was central to the exploration of college students with learning disabilities as they developed through the years and as they function in the midst of the college experience.

Area II - Identification of successful coping strategies developed by college students with learning disabilities

| |
|---|
| Q. 4. What coping strategies did college students with learning disabilities develop to deal with past schooling? |

Q. 5. What are the coping strategies college students with learning disabilities use to deal with college work?

By definition, a student with learning disabilities is of at least average intelligence and possesses greater than usual variability among his abilities and achievements. For example, in order to attain a full-scale intelligence quotient in the high-average or superior range on the Wechsler Adult Intelligence Scale, a college student with learning disabilities must exhibit some extremely high subtest scores to counterbalance his deficits.

Piaget (1963) conceives of intelligence as adaptation. Adaptation consists of the equilibriation of the processes of assimilation and accommodation. Sigel (1969) explains:

> Intelligence is that set of actions and processes by which man asimilates knowledge and makes the necessary accommodations to his new knowledge (p. 466).

In the adaptation process, the learning disabled child faces an added burden when compared to non-learning disabled children. In addition to making the usual assimilations and accommodations required to learn, develop and mature, the learning disabled child must learn how to balance his highs and lows and compensate for his specific deficits and disabilities. In addition to adapting to the demands of an outer reality, the child with learning disabilities must adapt to his own internal uneven or disequilibriated state caused by the learning disability. An assumption of this study is that a learning disability creates additional disequilibria in the process of assimilation and accommodation. Students with learning disabilities must therefore develop coping strategies to deal with the disequilibrium. How bright students, who have gained admission to a selective university such as Clark University, deal with the disequilibrium caused by their learning difficulties was one aspect of the research.

In Assessment in Special and Remedial Education, Salvia and Ysseldyke (1978) discuss assessment of learning disabilities. They state that the standard mark of learning disabilities is a significant discrepancy between measured intelligence and achievement, or between intelligence and perceptual or language functioning, or both (p. 409). They refer to the U.S. Office of Education definition of learning disabilities aforementioned and state that the operationalization of this definition has led to a search for deficits to diagnose students as learning disabled. The various definitions of learning disabilities (Bateman, 1964; Lerner, 1971; Myklebust, 1963; Kirk & Gallagher, 1979) reiterate the notion of discrepancy between potential and achievement or discrepancies among abilities. The custom of profiling students' abilities in order to assess discrepancies has become widespread in the LD field.

Salvia and Ysseldyke define scatter as "large intraindividual differences on a profile' (p. 410), and state:

> The difficulty is that persons who are brain-injured, disturbed or disadvantaged sometimes do not exhibit scatter while normal individuals occasionally do exhibit scatter. Thus, while profile scatter may distinguish groups or individuals, it does not typically distinguish individuals (as learning disabled) (p. 410).

In their discussion of perceptual-motor assessment, Salvia and Ysseldyke make the same point: currently used perceptual-motor tests differentiate between groups of brain-injured subjects; they cannot differentiate between individuals who may have brain injury or neurological dysfunction and individuals with no such dysfunction.

Coles (1978), in a comprehensive review of validation studies of recommended LD diagnostic instruments, states:

> the special knowledge upon which the entire (LD) field rests is the ability to diagnose the presence of learning disabilities in children and prescribe effective programs of treatment (p. 314).

He categorizes the tests of the learning disabilities battery into measurement of perception, language, intelligence, and neurological function, and states that the tests are ultimately designed to assess whether or not neurologial impairment is affecting learning. Coles' conclusion, after a thorough review of the ten most frequently used tests for diagnosing learning disabilities, is that the tests do not measure neurological dysfunctions in LD children. He notes that methodological problems in the research reviewed confound the problem, but there is "support for the position that we do not know what these tests measure" (p. 328).

Other authors have discussed the inadequacy of the LD assessment battery and have criticized specific tests for their inability to differentiate between learning disabled and non-learning disabled populations (Cruickshank & Hallahan, 1975). Hallahan & Cruickshank (1973) and Coles (1978) cite methodological problems in much of the research reported in this area. For example, in a typical type of research study, retarded readers are identified in a particular school system. They are given a variety of assessment devices. A control group of non-retarded readers is given the same battery. Then, the researchers ascertain whether the experimental group performed significantly different than the control group. However, the possibility exists that students identified as retarded readers or even students diagnosed as learning disabled may be inappropriately labelled as LD. Therefore, significant differences could fail to emerge between experimental and control groups because of poor sample selection and weak methodology.

An alternate hypothesis is possible for the lack of clear differentiation between LD and non-LD populations by performance on assessments. As Salvia & Ysseldyke, and Lezak (1976) assert, so-called normal individuals often test like LD subjects and show the same subtest scatter patterns as LD subjects. Perhaps this phenomenon can be explained not by poor assessment instrument but by coping behaviors developed by the so-called normal subjects. For example, a student is classified as normal (non-learning disabled) because he is not experiencing academic difficulties and his achievement is commensurate with his ability. He is tested with instruments from the LD battery and his profile exhibits scatter, or perhaps he evidences visual-motor problems. Yet, he is achieving adequately in school and has never been diagnosed as LD. Perhaps he has escaped classification as learning disabled precisely because he has developed strategies to cope with his particular deficits, while another student with the same deficit becomes labelled learning disabled due to a lack of compensatory behaviors.

Preliminary data gathered by the author as well as a review of the existing literature about college students with learning disabilities indicates that these students have developed coping strategies in the past to help them learn and continue to use coping strategies to deal with their learning disabilities in the college environment.

Bruner (1963) states:

> There is a sharp distinction that must be made between behavior that copes with the requirements of a problem that is designed to defend against entry into the problem (p. 4).

Students with learning problems and disabilities who continue their education in college have chosen to cope with their difficulties rather than avoiding academics. Adults with diagnosed learning disabilities who have graduated from college describe their coping strategies (Simpson, 1979; Brown, 1981).

The rehabilitation literature (Wright, 1960) describes how some handicapped individuals develop extraordinary abilities due to the deficits caused by their handicaps. The very same phenomenon may occur in the learning disabilities area. Therefore, a learning disability may possibly be conceptualized as the lack of coping mechanisms to deal with deficits rather than the actual presence of deficits in particular areas.

Alley and Deshler (1979) report that adults who once had or still have learning disabilities may be quite successful and well adjusted in personal and occupational life. Possessing average or above-average intelligence may enable secondary learning disabled students to develop compensatory strategies to assist learning. Deshler (1978) suggests investigation of strengths in LD adolescents as a direction for fruitful research:

> Few researchers or authors have emphasized areas of strength of learning disabled adolescents. Most characteristics are defined in terms of weakeness and do not consider integrities that are available for compensating for the deficit or circumventing it. (p. 70)

The case studies and reports available in the literature give specific coping strategies individuals have developed due to problems associated with learning disabilities. For example, Kronick (1970) discusses how an LD adolescent and his parents developed a strategy to overcome disorganization. His parents discuss his day with him each morning at breakfast. Then, the student pastes his timetable on his workbook and looks at the timetable before each class. He has a special sheet in his notebook to record homework assignments, etc. This routine helps overcome the student's confusion and disorganization. Susan Hampshire, a British actress known for her part in the T.V. serial "The Forsythe Saga" is dyslexic, and must memorize all her scripts. During the filming of "The Forsythe Saga" she was the only member of the cast who could not read the teleprompter.

Warner, Schumaker, Alley and Deshler (1980) investigated if and how learning disabled adolescents differ from other low-achieving students. They found achievement and ability differences between the two groups, but not other unique characteristics. Their data "suggest that a substantial proportion of students in LD programs at the secondary level exhibit generalized rather than specific learning deficits" (p. 34). These researchers speculate that high-ability adolescents with learning disabilities develop ways of coping with or overcoming deficits. However, no description of these coping skills appears in their research account. Another study (Schumaker, Deshler, Alley & Warner, 1980) postulates, however, that parents of learning disabled students may be better advocates for their children, securing better services or providing more support. Therefore, help provided by parents or others may be a survival tactic benefitting LD children and adolescents. How college students with learning disabilities utilize others to help them cope was one focus of the present study.

Meyer and Lehr (1980), discuss the possibility that special education placements for mildly handicapped adolescents may protect these students from pressure and/or high expectations. The role of special education services was also explored in the present study.

### Area III - Identification of areas in which college students with learning disabilities are blocked in efforts to learn.

Q. 6. What are the areas in which college students with learning disabilities are unable to learn?

By definition, college students with learning disabilities possess deficits. The effect of these deficits were part of the study. Adults with learning disabilities have reported areas of learning which are totally impossible to them (Simpson, 1979). Some adults with learning disabilities never learn to read, or to remember sequences, or to write paragraphs.

Ugland and Duane (1976) describe a demonstration project serving learning disabled students at three Minnesota community colleges. In some cases, project participants were advised to make programmatic and/or course changes to ensure a compatible learning situation with the students' own learning patterns (p. 36). In addition, this same study found learning disabled students to have lower completion rates in required English courses and in mathematics and physics courses than non-disabled students. No comparable descriptive information was found for college students with learning disabilities at four-year colleges or universities. In addition to identification of specific subject areas which constitute barriers for learning disabled students, the research sought to establish if particular skills and learning processes constituted barriers to learning for college students with learning disabilities.

# CHAPTER III

# METHODOLOGY

## The Field Study Method

The research was an exploratory field study. The rationale for doing a field study of college students with learning disabilities has several facets.

The conclusion of Chalfant & Scheffelin's (1969) Central Processing Dysfunctions in Children: A Review of Research presents five general stages in gaining knowledge in any field:

1. recognition that a problem exists.
2. active investigation and identification of possible factors which may be contributing to the problem.
3. synthesis of relevant information.
4. translation into practical application.
5. dissemination of knowledge (p. 135).

We seem to be at the beginning of stage 2 in the area of college students with learning disabilities. There is recognition of the problem: learning disabled college students do exist. The publication of the pamphlet, "The Learning Disabled Student at Clark University" attests to Clark's recognition of the problem. Yet, active investigation and identification of factors pertaining to college students with learning disabilities has not been undertaken. Chalfant & Scheffelin state that "precise descriptions of specific observable behaviors related to dysfunctions in learning," (p. 146) is an area in which future research is needed.

Kerlinger's text, Foundations of Behavior Research (1973) presents different kinds of research. Field studies are defined as "ex post facto scientific inquiries aimed at discovering the relations and interactions among sociological, psychological, and educational variables in real social studies" (p. 405). There is no manipulation or variables. Two types of field studies are possible: exploratory and hypothesis-testing. Exploratory studies seek what is and may have three purposes:

> 1. to discover significant variables.
> 2. to discover the relations among variables.
> 3. to provide preliminary data upon which later, more systematic and rigorous study may be undertaken. (p. 406)

Field studies of the hypothesis-testing type have the goal of discovering or uncovering relationships among variables. This type of research is "...indispensable to scientific advance in the social sciences" (p. 406).

The preliminary and tentative state of knowledge about college students with learning disabilities pointed to an exploratory field study as the preferred research method. There is not enough available information about college students with learning disabilities to generate hypotheses about this group. Rather, specific questions emerging from the learning disabilities field were explored. A large number of variables deemed relevant to understanding college students with learning disabilities were studied.

Two types of data were collected in the study: qualitative and quantitative. In the field of psychology, the distinction is made between clinical and actuarial methods. The clinical method relies upon direct observation of the student; the actuarial method involves probability and a statistical basis. Zubin (1966), in a discussion of the two methods, states, "Scientific method is characterized by a continuous interaction between observation and schematization" (p. 625). Observation leads to hypothesis formation, which leads to verification or repudiation, which then call for further observations. The two types of methods are interactive.

The present study used both observation and qualitative data obtained about college students with learning disabilities as well as quantitative data from formal tests and other data collection methods to answer the questions about college students with learning problems. The data collection instruments used in the study were of two types, standardized psychoeducational assessments and instruments created for the study.

## Standardized Psychoeducational Assessments

Four types of abilities were examined through use of the standardized psychoeducational assessments presented in Table 1.

Table 1

Areas of Ability and Psychoeducational Assessments Used

| Area | Instruments |
|---|---|
| Ability | Wechsler Adult Intelligence Scale (WAIS) |
| Perceptual-motor Development | Bender Visual Motor Gestalt Test |
| Auditory/Language Development | Subtests of the WAIS |
| Academic Achievement | Test of Adolescent Language (TOAL) |
| | Wide Range Achievement Test (WRAT) |
| | Gates-MacGinitie Reading Tests |

These particular areas and instruments were chosen to provide descriptions of college students with learning disabilities on dimensions highlighted earlier in the literature.

## The Wechsler Adult Intelligence Scale Revised

Bannatyne (1971) cites the Wechsler Intelligence Scale for Children as an essential part of any diagnostic battery for testing children suspected of having learning disabilities. Thurlow and Ysseldyke (1979), in a nationwide survey of model Child Service Demonstration Centers (CSDC) developing programs for learning disabled children reported that the WISC/WISC-R was utilized by the highest percentage of CSDCs. The Wechsler Adult Intelligence Scale (WAIS) (Wechsler, 1955) is the appropriate Wechsler Scale for use with subjects aged 18 and older.

The WAIS was recently revised, and the Wechsler Adult Intelligence Scale-Revised (WAIS-R) (Wechsler, 1981) was chosen for this study. Salvia and Ysseldyke (1978) indicate that the Wechsler Sclaes are widely used individually administered intelligence tests. Raw scores are converted to scale scores with a mean of 10 and a standard deviation of 3.

The WAIS-R provides a full-scale IQ, a verbal IQ, and a performance IQ. Therefore, data is obtained on overall intellectual ability as well as specific abilities.

The internal consistency reliabilities for the subtests and three IQ scores are reported as split-half reliability coefficients for most scores (Wechsler, 1981, p. 29) and ranges from .68 to .97. The reliabilities of the Digit Span and Digit Symbol subtests were determined by test-retest coefficients based upon testing samples twice at four different age groups. These two reliability coefficients were .83 and .82 respectively (p. 30).

Wechsler (1981) states "A body of evidence, both rational and empirical, attests to the validity of the Wechsler adult scales as a measure of global intelligence" (p. 49). The first research on the relationship of the WAIS to the Stanford-Binet was done in 1955 using 52 prison inmates. Correlation of the WAIS full-scale IQ with the Stanford-Binet IQ was .85. Eighty studies from 1955-1980 compared the WAIS to other measures of global intelligence.

### Bender Visual Motor Gestalt Test

The Bender Visual Motor Gestalt Test (Bender, 1938), more commonly called simply the Bender-Gestalt, was used to assess visual-perceptual functions. The Bender-Gestalt consists of a set of eight drawings to be reproduced by the subject. It is designed for children aged 3-11, but has also been used with adults to detect delayed or disordered visual-motor functioning. It is one of the ten more commonly used tests in learning disabilities batteries (Coles, 1978).

### Test of Adolescent Language

The Test of Adolescent Language (TOAL) (Hammil, Brown, Larsen & Wiederholt, 1980) has been selected as a measure of several areas of language functioning. Becuase it is a new test, it is described here in more detail than the WAIS or Bender Gestalt.

Several authors in the learning disabilities field have commented that no appropriate devices or batteries exist with which to assess adolescents' language functioning. Certain instruments which are used to assess language functioning of children with learning disabilities, for example, the Illinois Test of Psycholinguistic Ability, are inappropriate for use with adolescents. In addition, study of language behavior needs to encompass the four main components of language behavior: listening, speaking, reading, and writing (Sitko & Gillespie, 1978). Wiig and Semmel, in Language Assessment and Intervention for the Learning Disabled (1980) state that:

> ...verbal and nonverbal communication deficits may continue to influence the quality of a child's interpersonal interactions (in adolescence)...the assumption that the learning disabled child will outgrow his deficits and be normal as an adolescent and young adult is proving erroneous (p. 21.).

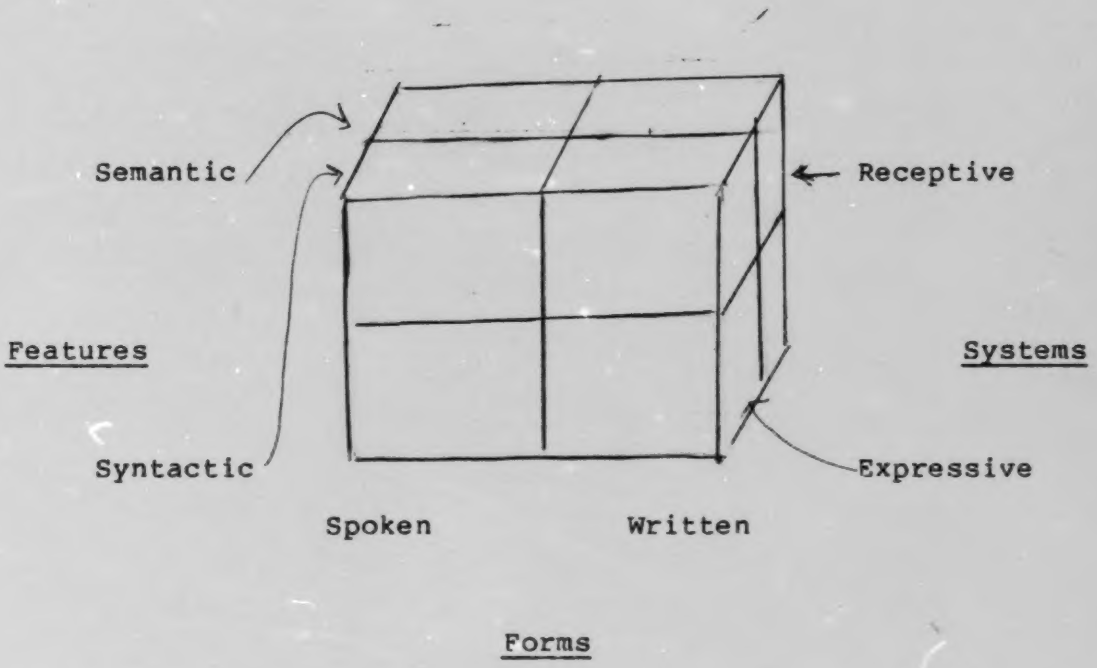
In reviewing the literature on developmental language stages of adolescents, Hammill, Brown, Larsen, and Widerholt (1980) were able to find only two studies dealing with the subject. Two attempts at developmental language asessment for adolescents are the Language Assessment Tasks (Kellman, Flood & Yoder, 1978) for grades 4 to 8 and a series of tasks for use with adolescents developed by Wiig and Semmel (1980). Unfortunately, neither of these assessments are empiricially sequenced through description observations or through normative data (Hamill et al., 1980, p. 5).

The TOAL was constructed to fill a gap in existing assessment devices for testing adolscent language abilities.

The model upon which the TOAL is based is in Figure 2.

Figure 2

The TOAL Model


Semantic
Receptive
Features
Systems
Syntactic
Expressive
Spoken
Written
Forms

The model includes the form of language, spoken and written, and the features of language, semantics and syntax.

The TOAL features eight subtests. The subtests and their relation to the test model are summarized in Figure 3.

Figure 3

Relationship of TOAL Subtests to Test Model

| Form | System | Feature | TOAL Subtest Name |
|---|---|---|---|
| Spoken | Receptive | Vocabulary | Listening/Vocabulary |
| Spoken | Receptive | Grammar | Listening/Grammar |
| Spoken | Expressive | Vocabulary | Speaking/Vocabulary |
| Spoken | Expressive | Grammar | Speaking/Grammar |
| Written | Receptive | Vocabulary | Reading/Vocabulary |
| Written | Receptive | Grammar | Reading/Grammar |
| Written | Expressive | Vocabulary | Writing/Vocabulary |
| Written | Expressive | Grammar | Writing/Grammar |

In addition to the eight subtest scores, ten composite quotients may also be obtained. The composite variables are:

1. listening
2. speaking
3. reading
4. writing
5. spoken language
6. written language
7. vocabulary
8. grammar
9. receptive language
10. expressive language

The TOAL subtests yield scaled scores; the scaled scores have a mean of 10 and a standard deviation of 3, coinciding with the distribution of the WAIS. The ten composite quotients are constructed by using the subtests scaled scores and then converting them into quotients with a mean of 100 and a standard deviation of 15. Raw scores are not converted into age or grade equivalents. The internal consistency reliability coefficients of the subtests ranged from .6 to .9, with 70% of the coefficients reaching or exceeding .80, "the minimum level for indicating educational usefulness" (Hammill et al., 1980, p. 19). The composite score reliability coefficients ranged from .7 to .9, with 99% of these coefficients exceeding 99%. The test-retest reliability coefficients for subtest and composite scores all reach or exceed .81 with the exception of the listening/grammar subtest, which has a test-retest coefficient of .74 (Hammill et al., 1980, p. 20).

The interrater reliability study conducted by the test authors yielded percentages of agreement ranging from 82 to 100% (Hammill et al., 1980, pp. 21-22).

Content validity of the TOAL is not studied. Criterion validity was studied by correlated TOAL results with five tests of language skills. The authors state, "A review of these data indictes that the TOAL values are strongly correlated with the criterion tests" (Hammill et al., 1980, p. 23).

The TOAL assesses language functioning of students in grades 6-12. It was used with college students due to the lack of equivalent or better instruments designed for the college-level student.

## Wide Range Achievement Test

The Wide Range Achievement Test (Jastak & Jastak, 1978) was first standardized in 1936 to assess "the basic school subjects ofreading, word recognition and pronunciation, written spelling, and arithmetic computation" (Jastak & Jastak, 1978, p. 1). It has been revised four times; the latest revision occurring in 1978. Level II is intended for peresons from 12 years 0 months to adulthood. The three tests, Reading, Spelling, and Arithmetic yield both grade equivalents and standard scores. The authors state that above age 14, grade ratings are anchors rather than precise grade placement measures and must be changed into standard scores for calculation or comparison purposes (p. 15). The raw scores for each test are converted into standard scores with means of 100 and standard deviations of 15. The only reliability coefficients reported in the manual are split-half reliabilities of subtests by grade level, which all exceed .94 (Jastak & Jastak, 1978, p. 46). Salvia and Ysseldyke (1978, p. 160) criticize the WRAT for lack of content validity because the WRAT samples "only very limited aspects of reading, spelling, and arithmetic curricula."

The WRAT is one of the five most used assessment devices for learning disabilities used by Child Service Demonstration Centers (Thurlow & Ysseldyke, 1979). Salvia and Ysseldyke (1978) state that the WRAT is one of two available individually administered tests of academic achievement (p. 161). They feel that teachers can use the WRAT for global pictures of achievement, but should make curricular decisions on tests providing larger sample of behavior. For the present purposes, the WRAT is sufficient. The other individually administered achievement test on the market is the Peabody Individual Achievement Test (PIAT) (Dunn & Markwardt, 1970). It is not standardized on an adult sample. Secondly, the PIAT calls for oral responses; the WRAT utilizes both oral and written behavior. Therefore, in addition to normative data (grade level, percentile, standard scores), the WRAT subtests provide specific information about types of and some process information as well. Only the spelling and mathematics subtests were included in this study. Reading was omitted because more comprehensive measures of reading are included in two other assessments, the Gates-MacGinitie Reading Tests and the Test of Adolescent Language.

### Gates-MacGinitie Reading Tests, Survey F

Reading is the primary area affected by learning disabilities in young children. It is therefore important to learn if college students with learning disabilities exhibit reading disabilities of deficits. If they do have reading problems, what are they and how do these deficits affect functioning? Therefore, in addition to reading information available from the Test of Adolescent Language, another reading test was chosen for this study.

The Gates-MacGinitie Reading Tests, Form F (Gates & MacGinitie, 1978), are a group administered survey instrument designed to measure reading abilities of students in grades 10 to 12. Alley and Deshler (1979) list the areas of vocabulary development, reading comprehension and reading rate as essential ones in evaluating reading deficits in LD adolescents. They cite the Gates-MacGinitie Reading Tests as one of three standardized reading tests most useful in evaluating LD adolescents (p. 67).

The 1978 tests have two sections, Vocabulary and Comprehension. Reliability data comes from separate reliability testing of four to six communities (Gates & MacGinitie, 1978, p. 3). Median alternate-form reliability coefficients are given, and range from .67 to .89, and median split-half reliabilities range from .88 to .96. The authors of the test explain that it's content validity depends upon the extent to which the test assesses skills taught in a particular curriculum. In the test manual, an unpublished doctoral dissertation is cited in which the subtests of the Gates-MacGinitie tests correlate with four other standardized reading tests in the .70 to .85 range (Salvia & Ysseldyke, 1978, p. 154).

## Instruments Created for the Study

An individually-administered interview, informal assessment of work products, and data about students' use of time provided information about coping strategies and barriers to learning.

### The Interview

To provide the opportunity for college students with learning disabilities and indicators of learning disabilities to give their personal perspectives an individually administered interview was used.

The interview for the study was designed by the researcher. One interview schedule was created for the study; after tryout with the first subjects, it was revised according to input of the interviewers.

The interview was used to explore past background and current functioning in college. It addressed areas in which learning was problematic and coping strategies used to overcome learning problems. The areas of the interview were:

1) personal and physical data.
2) learning before college entrance.
3) current functioning in college.

Both original and revised interview forms appear in Appendix A.

The sections covering personal and physical data included identification of handedness, possible mixed dominance, questions about wearing of vision or hearing aids, general physical problems, past diagnosis of learning disabilities and family history of learning problems.

The section concerning past academic history originally had three parts, elementary learning, junior high school learning and senior high school learning. The questions were open-ended in form. For example, in the original interview schedule, a question was:

> What was learning in elementary school like for you? What was easy? What was hard?

The interviewers found this type of question awkward, and suggested more structure, such as asking about specific subjects. Also, the interviewers noted repetition of answers for the junior and senior high areas, and suggested collapsing these two time periods into one area of questioning. The researcher revised the interview form to comply with these recommendations.

The section on functioning in college remained the same as in the original form. Questions about ease of learning in college, use of assistance in learning, and specific areas of learning were included in this part of the interview.

The interviews were tape-recorded unless a student requested that taping be omitted. Only one student objected to having the interview tape-recorded.

### Time Log

For the time log, each participant was asked to keep a record for one week of time spent sleeping, studying, in classes, in leisure activities, and in other activities (see Appendix B). The number and length of study sessions were also computed from the time log form. It was planned to have all subjects complete the time log for the same week of classes in mid-November 1981.

### Paper and Exam

Each participant was asked to give the researcher an in-class essay exam and a paper done for a college course. Students were asked to pick a typical example of each, not necessarily their best or worst work. The exam was rated on the following factors: neatness, grammar, ideas, and overall spelling ability, and number of spelling mistakes. The paper was to be rated by the research aides on these variables: overall organization, neatness, grammar, ideas, and overall spelling ability. These materials were collected to obtain a sample of actual college work, an additional perspective to performance on standardized tests. The rating sheet used appears in Appendix B.

## Categorization of the Sample

The sample consisted of two major groups, students with learning disabilities and characteristics of learning disabilities, and control subjects. In addition to dividing the subjects into learning disabled and nondisabled, the researcher was interested in differences between students with good and poor academic performance at Clark University. The four subgroups of the study population were:

Group 1:

College students with learning disabilities and indicators of learning disabilities who have good academic performance in college.

Group 2:

College students with learning disabilities and indicators of learning disabilities who have poor academic performance in college.

Group 3:

College students with no indicators of learning disabilities who have good academic performance in college.

Group 4:

College students with no indicators of learning disabilities who have poor academic performance in college.

The cumulative grade point average (GPA) was selected as the criterion for good or poor academic performance.

## Comparisons Made Between Subgroups

The sample was thus split into four subgroups as shown in Figure 4.

Figure 4

Subgroups in the Study

| | LD | Control |
|---|---|---|
| Good Academic Performance | 1<br>Good Academic Performance LD | 3<br>Good Academic Performance Control |
| Poor Academic Performance | 2<br>Poor Academic Performance LD | 4<br>Poor Academic Performance Control |

The major objective of the research was exploration of differences between LD and control subjects. However, another interest was exploration of coping strategies used by academically successful students. Therefore, two different types of comparisons were made.

The types of comparisons made on the variables were:

| | |
|---|---|
| All LD compared to all Control | Groups (1+2) compared to Groups (3+4) |
| Good Academic Performance LD compared to Poor Academic Performance LD | Group 1 compared to Group 2 |

In addition, the learning disabled subjects were re-grouped on the basis of grade point averages into highest, middle, and lowest academic achievement. The middle group was excluded and only the highest and lowest groups were compared on selected variables, to see if there were any differences between the best achieving and poorest achieving LD subjects that might be otherwise obscured.

## Hypotheses Tested

### Question 1a

How do college students with learning disabilities perform on psychoeducational assessments?

### Hypothesis 1a

College students with learning disabilities and indicators of learning disabilities perform differently on psychoeducational assessements than college students without learning disabilities and indicators of learning disabilities.

College students with learning disabilities and indicators of learning disabilities are thought to be psychoeducationally different from college students without learning disabilities and indicators of learning disabilities. It was expected that college students with LD would show poorer performance on most of the psychoeducational assessments than control subjects. However, some areas of strength could conceivably be higher in the LD group than in the control group. The study explored many different areas of psychoeducational functioning to actually determine which differences exist between these two groups.

## Hypothesis 1b

College students with learning disabilities and indicators of learning disabilities who have good academic performance in college perform the same on psychoeducational assessments as college students with learning disabilities and indicators of learning disabilities who have poor academic performance in college.

In addition to differences between learning disabled and nondisabled students, the research explored possible differences between those students with learning disabilities and indicators of learning disabilities who had good academic performance in college and those with poor academic performance in college. Based upon preliminary work and literature review, the researcher hypothesized that differences between LD students with good and poor academic performance were due to factors other than psychoeducational ones, and that no differences between these two groups would emerge on variables assessing psychoeducational performance.

The variables addressing Hypotheses 1a and 1b are found in Table 2.

Table 2

Variables Addressing Hypothesis la and lb

| Instrument | Variable |
|---|---|
| WAIS-R | Overall IQ |
| WAIS-R | Verbal IQ |
| WAIS-R | Performance IQ |
| WAIS-R | Difference Verbal/Performance IQ |
| WAIS-R | Scatter Score |
| WAIS-R | Information Subtest Score |
| WAIS-R | Digit Span Subtest Score |
| WAIS-R | Vocabulary Subtest Score |
| WAIS-R | Arithmetic Subtest Score |
| WAIS-R | Comprehension Subtest Score |
| WAIS-R | Similarities Subtest Score |
| WAIS-R | Picture Completion Subtest Score |
| WAIS-R | Picture Arrangement Subtest Score |
| WAIS-R | Block Design Subtest Score |
| WAIS-R | Object Assembly Subtest Score |
| WAIS-R | Digit Symbol Subtest Score |
| WAIS-R | Bannatyne Spatial Ability Score |
| WAIS-R | Banatyne Sequencing Ability Score |
| WAIS-R | Bannatyne Verbal Conceptualization Score |
| WAIS-R | Bannatyne Acquired Knowledge Score |
| WAIS-R | ACID Score |

Table 2 (continued)

| Instrument | Variable |
|---|---|
| WAIS-R | Memory Score |
| Bender Gestalt | Bender Score |
| TOAL | Adolescent Language Quotient |
| TOAL | Listening Quotient |
| TOAL | Speaking Quotient |
| TOAL | Reading Quotient |
| TOAL | Writing Quotient |
| TOAL | Spoken Language Quotient |
| TOAL | Written Language Quotient |
| TOAL | Vocabulary Quotient |
| TOAL | Grammar Quotient |
| TOAL | Receptive Language Quotient |
| TOAL | Expressive Language Quotient |
| WRAT | Spelling Score |
| WRAT | Math Score |
| Gates-MacGinitie | Vocabulary Score |
| Gates-MacGinitie | Comprehension Score |
| Gates-MacGinitie | Overall Reading Score |

Each variable from the psychoeducational assessments is discussed in detail.

## WAIS-R

### Overall IQ, Verbal IQ, Performance IQ

The WAIS-R was used as an indicator of average intellectual ability, the criterion being an IQ of 85 or better on the overall IQ or on the verbal or performance sections. The WAIS was then useful in determining specific abilities and deficits and provided information about inter and intra-subject scatter.

Sample subgroups were first compared on overall IQ, verbal IQ and performance IQ, to see if any differences emerged.

The scaled scores for subtests on the WAIS-R have a mean of 10 and a standard deviation of 3. Wechsler (1974) states, "Differences as large as five points (between any two subtest scores) may be unusual enough to be noteworthy; smaller differences should be recognized as more common and less likely to be significant" (p. 17).

The testing was done by neuropsychologists and neurologists in evaluating persons for organic impairment is also relevant to this study. Some definitions of learning disabilities include a criterion related to brain injury or more commonly, "minimal cerebral dysfunction" or "minimal brain damage." This criterion has been the cause of considerable debate and controversy in the field. The U.S. Office of Education definition of learning disabilities and Kirk and Gallagher's definition do not necessitate evidence of minimal brain dysfunction. However, evidence of possible minimal brain damage may show up during psychoeducational evaluations. Lezak (1976) reports that scaled score deviations of four to five points when measured from the subjects' high scores are significant in assessing possible organic damage. Lezak suggests:

> For most practical purposes, the examiner can consider discrepancies for four scaled score points as approaching significance and discrepancies of five or more scaled score points to be significant, i.e., nonchange. (p. 193)

Therefore, scaled score differences of five or more subjects' highest scaled scores attained on the WAIS were considered significant. The pattern of strengths and weaknesses on the WAIS-R as well as how the subjects did the required tasks served as one basis for data analysis.

### Difference Verbal/Performance IQ

The research also examined differences between verbal and performance IQ's among subgroups by computing the difference between these scores for each subject.

### Scatter Score

Overall scatter was examined by computing the difference between the highest and lowest subtest scale scores.

### Information Score, Digit Span Score, Vocabulary Score, Arithmetic Score, Comprehension Score, Similarities Score, Picture Score, Completion Score, Picture Arrangement Score, Block Design Score, Object Score and Digit Symbol Score

Comparison of sample subgroups on each of the WAIS-R subtests was included to provide information about performance of college students with learning disabilities. Also, separate analyses for each subtest were included to establish if distinct patterns of WAIS performance emerged for the target population.

### Bannatyne Spatial Ability Score, Bannatyne Sequencing Ability Score, Bannatyne Verbal Conceptualization Score, Bannatyne Acquired Knowledge Score, and ACID Score.

Despite the cautions against using profile scatter diagnostically, a number of researchers and theorists in the LD field have attempted to analyze learning disabled students according to scatter analysis of the Wechsler scales. A summary of the research on analysis of WISC or WAIS profiles of learning disabled populations is presented below.

Clements, Lehtinen, and Lukens (1964) found three typical patterns on the WISC for children with minimal brain dysfunction. They are:

Pattern 1 -- Wide scatter in either or both scales with low scores in Arithmetic, Block Design, Object Assembly, Digit Span, Coding and Mazes.

Pattern 2 -- Verbal Score 15 to 40 points higher than the Performance IQ. Arithmetic subtest score may be low.

Pattern 3 -- A Performance IQ 10 to 30 points above the Verbal IQ.

Hartlage (cited in Marsh, Gearheart & Gearheart, 1978) identifies three patterns similar to those given by Clements. His patterns are:

Type 1 -- Lower Verbal scores. Inferiority of language dependent skills. Persistent school problems.

Type 2 -- Lower Performance IQ scores. Inferiority on perceptual-motor skills. Impulsivity. Good prognosis for educational success.

Type 3 -- Erratic profile scatter, no superiority on either scale. Signs of neurological disturbance. Hyperactive, irritable. Poor prognosis for school success (p. 78).

Bannatyne (1971) has proposed a recategorization of the WISC for purposes of identifying groups of learning disabled children. He groups the following subtests into the following abilities.

Spatial Ability

Picture Completion
Block Design
Object Assembly

Sequencing Ability

Digit Span
Arithmetic
Coding

Verbal Conceptualization Ability

Comprehension

Similarities
Vocabulary

Acquired Knowledge

Information
Arithmetic
Vocabulary

Bannatyne suggests summing the scale scores in each ability area to determine the average scaled score in each area. Then, analysis of the subject's average scores in each of the four areas may show patterns of differences between areas.

Some of the research done with children who have definite signs of neurological damage is relevant to the study of learning disabled students because subtest patterns on the WISC are often similar or the same in both groups (Marsh, Gearheart & Gearheart). Dykman and Ackerman (cited in Marsh, Gearheart & Gearheart, 1978, p. 79) describe an ACID score, consisting of low scores on the Arithmetic, Coding, Information and Digit Span subtests of the WISC, as characteristic of learning disabled students in the elementary grades. This low ACID pattern periods into adolescence.

The Bannatyne recategorization of the Wechsler Scales and usefulness of the ACID score has not been researched with college students with learning disabilities. Bannatyne's approach and the ACID factor, which have been useful in diagnosing children with learning disabilities, were tested with the present population.

## Memory Score

After subjects completed the Digit Symbol Subtest of the WAIS, they were asked to fill in the correct numbers for the code without looking at the guide numbers. The total of symbols correctly written was termed the Memory Score. There is no reference in the literature for this type of analysis, but the information was available and this score was used as another variable.

## Bender-Gestalt

### Bender Score

Perceptual and motor deficits of LD adolescents tend to improve with age, but college students with learning problems may still exhibit deficits in this area. The Bender Visual Motor Gestalt Test was used in the study because, as Bender (1938) states:

> All figures are satisfactorily produced at the age of eleven years. Adults add only a certain motor perfection or perfection in detail in size and distances. The test may therfore be considered of value as a maturation test of performance in the visual motor Gestalt functioning betwen the ages of 4 and 11 - which is the age when language function, including reading and writing are developing. (p. 112)

Failure of one or more of the Bender designs is an indication of problems in perceptual-motor development. The Bender Score in this study is the number of designs failed.

Students with visual-perceptual difficulties may learn to compensate for perceptual impairment. Koppitz (1963) gives a list of different types of behavior observed in brain injured children trying to compensate for difficulties in visual-motor perception. These behaviors are:

> Excessive amount of time required to complete Bender Test.
>
> Tracing of design with finger before drawing it.
>
> "Anchoring" design with finger, i.e., placing finger on each portion of design on the stimulus card as it is drawn.
>
> Glancing once briefly at picture of design and then removing card from sight and working entirely from memory, as though the presence of the stimulus card were confusing.
>
> Rotation of stimulus card and of drawing paper and then copying design in rotated position but turning paper back to correct position after the drawing has been completed.
>
> Checking and re-checking of dots and circles several times and still being uncertain a about the correct number involved.
>
> Impulsive, hasty drawings which are spontaneously erased and then corrected with much effort.
>
> Expressed dissatisfaction with poorly executed drawings and repeated efforts to correct these which may or may not be successful. (p. 87)

Subjects who successfully copy the designs but resort to one or more of the eight mechanisms listed above were also considered as having problems in visual-motor functioning.

When students used unusual methods of copying and completing the designs (tracing with fingers, refusal to look at drawings while copying them, etc.), these were noted, viewed as possible coping mechanisms, and related to the other findings.

### TOAL

#### Adolescent Language Quotient, Listening Quotient, Speaking Quotient, Reading Quotient, Writing Quotient, Spoken Language Quotient, Written Language Quotient, Vocabulary Quotient, Grammar Quotient, Receptive Language Quotient, and Expressive Language Quotient

In a study of the TOAL's ability to distinguish between learning disabled and non-handicapped students, the learning disabled students scored at least one standard deviation below the non-handicapped population on every subtest but speaking/grammar and listening/grammar and at least one standard deviation below the central group on all composite scores. These results are consistent with stages of language development. Spoken language develops first, then reading ability, and last, writing ability. The mean Written Language Quotient and mean Writing Quotient of the LD subjects were fully two standard deviations below the mean of the control group in the study.

Information about language functioning of college students with learning disabilities is not readily available.

Therefore, the TOAL was used to ascertain if the sample subgroups differed from each other in the area of language functioning.

## Spelling Score

The WRAT, as one of the five most used assessment devices for determining learning disabilities in children, was included to explore differences between learning disabled and non-disabled students in a college population.

Spelling is often cited as a problem for children and adolescents with learning disabilities (Johnson & Myklebust, 1965; Boder, 1970).

> Disabilities in spelling have been related to problems or combinations of problems in visual memory, auditory memory, auditory and visual discrimination, and motor skills. Ultimately, these skills must be integrated for proper execution in correct spelling (Marsh, Gearheart & Gearheart, 1978, p. 110).

The extent of spelling problems for college students with learning disabilities is not known; the spelling section of the WRAT, along with the spelling subtest of the TOAL, were used to explore this area.

## Math Score

The area of mathematics disabilities in secondary students has received much less attention than reading disabilities. Myers & Hammill (1969), in a review of methods for learning disorders, state that little attention has been directed towards arithmetic disabilities, and that mathematics disabilities at the upper grade levels are virtually ignored. Cawley (1978) explains that mathematics difficulties in secondary students may arise due to mathematical disabilities themselves, but may also occur because of poor reading and/or language skills.

Verbal ability affects mathematical learning (Chalfant & Scheffelin, 1969). Verbal facility is necessary for organization and categorization of information, and for forming concepts such as magnitude, conservation, number, and time. The ages at which normal children acquire concepts of quantity, size, number, volume, and time may be different for LD children. Chalfant & Scheffelin also make the distinction between the inability to read and the inability to perform mathematical operations as two different aspects of mathematics problems in learning disabled students. It is important to pinpoint which area is causing difficulties.

Chalfant & Scheffelin (1969) state that spatial ability has been shown to be an important factor in mathematical ability, noting that spatial ability is itself composed of several types of abilities. Chalfant & Scheffelin cite factorial studies which identify a visualization factor, a perceptual speed factor, a length estimation factor, object constancy, directional constancy, and form constancy (p. 120). Johnson & Myklebust (1967), using the term dyscalculia to describe arithmetic disabilities, also cite deficient visual spatial organization as one important factor. However, the role of spatial disabilities in mathematics learning of LD adolescents is not clear.

Johnson & Myklebust (1967) give the following constellation of characteristics of dyscalculia:

1. poor spatial organization
2. superior auditory abilities
3. high reading vocabulary and skills
4. disturbed body image
5. disorientation problems
6. poor social perception
7. higher verbal than nonverbal functioning

Lerner's (1971) writings give similar characteristics to those posed by Johnson & Myklebust. Cohn (1971) emphasizes the symbolic nature of mathematics and its interrelation with logical processes. He sees arithmetic disabilities as a subset of language disabilities and occurring as part of a disorganization syndrome.

Marsh, Gearheart & Gearheart, (1978) discuss the lack of research in learning disabilities and mathematics at the second level and state:

> The ability of students to avoid further classes in mathematics may be one reason why there has been little interest in conducting research in learning disabilities and mathematics at the secondary level. In fact, there

> has been little interest at any level (in mathematics). The overriding concern has been with reading. (p. 113)

Much more description and research is needed in the area of mathematical ability and functioning of adolescents with learning disabilities. This study assessed achievement in mathematics for college students with learning difficulties by use of the Wide Range Achievement Test.

## Gates-MacGinitie Reading Tests

### Vocabulary Score, Comprehension Score, and Overall Score

"More than any other problem in learning disabilities, reading has been the focus of much research and thought" (Marsh, Gearheart & Gearheart, p. 103). Research shows that students with reading difficulties continue to experience problems in the secondary school. However, the approaches used to help younger children with learning disabilities are not always appropriate for adolescents.

Gillespie & Sitko (1978) explain that certain problems impinge upon studying reading characteristics of learning disabled adolescents, including:

> 1. reading characteristics of elementary LD students receive much attention, while reading in LD adolescents is studied much less frequently
> 2. criteria for identifying LD adolescents vary
> 3. interpretation of the reading process differs, influencing descriptions of the reading characteristics of LD adolescents (p. 170).

In addition, not all reading failure is the result of specified learning disabilities even though many LD adolescents who exhibit severe reading disorders are often called dyslexic (Gillespie & Sitko, p. 170). Therefore, discussion of the reading characteristics of LD adolescents must be tempered with the knowledge that the accuracy of data in this area is affected by the above problems.

Johnson & Myklebust (1965) studied the reading characteristics of 60 dyslexic students, 24 of whom were adolescents. These students had a mean IQ on the WISC of 103.9. Oral reading, vocabulary and comprehension scores were substantially below average. These subjects evidenced memory impairments, lowered scores in the Draw-A-Man Test, and had problems with memory skills. The authors found that these students showed problems in their reading such as auditorizing while reading, difficulty in discriminating letter sounds sounds and problems in sound blending. They proposed three categories of dyslexic readers based upon their observation.

1. Visual dyslexics - those with problems in discriminating words and remembering visual images

2. Auditory dyslexics - students having adequate visual ability but experiencing difficulty in auditory discrimination, auditory memory and blending

3. Dyslexics with trouble integrating auditory and visual material.

Boder (1970) studied dyslexics who were eight to eighteen years of age and found three types of reading problems:

1. Dysphonetic dyslexics - deficits in letter-sound integration and the inability to develop phonetic skills. Poor spelling was characteristic of this group.
2. Dyseidetic dyslexics - problems with perceiving whole words as gestalts. Reading is phonetic, not sight.
3. Mixed - a combination of both dysphonetic and dyseidetic types, the most serious types of reading disorder.

Boder's categories are quite similar to those cited in Myklebust & Johnson's work.

Myklebust (1965) studied a group of children placed in remedial reading classes. The reading disabled students scored lower as they became older. Students scored lowest on tests and subtests tapping verbal skills and did better on nonverbal tasks. Myklebust found a plateau of auditory receptive language at age thirteen, with poor readers attaining an average score of nine years in this area. Fifteen-year-olds with reading disabilities performed like eleven-year-old controls in the ability to comprehend instruction auditorally. Scores on auditory expressive tasks were even lower; fifteen-year-olds attained scores at the nine year level on a test requiring giving verbal opposites. Myklebust concluded that the children with reading disabilities did not make expected gains as they got older, and many evidenced greater retardation year by year.

Koppitz (1971) did a follow-up study of learning disabled students ranging in age from 11 to 18. Koppitz was able to follow the students for a five-year period. Koppitz found that learning disabled students who were returned to regular classrooms were better readers from the start of their placement as LD students than those who needed long-term remedial help. In addition, Koppitz found that referrals for students to be placed in learning disabilities programs occurred more often because of behavior problems than reading difficulties. Koppitz also concluded that the LD children who were most able to profit from the regular class had parents who were supportive and cooperative.

In summary, the studies conducted to determine reading characteristics of learning disabled adolescents show certain groupings or typologies of problems, which can be categorized as auditory, visual, and mixed reading deficits. Adolescents with learning disabilities score significantly lower than controls on certain tasks thought to be critical to reading, for example, auditory discrimination. The best prognosis seems to occur in the least disabled readers who come from supportive home environments; the most difficult cases show progressively less progress each year. Some adolescents with learning disabilities may also use crutches, such as auditorizing, to help them with reading. The Gates-MacGinitie Reading Tests provided needed data about reading characteristics of college students with learning disabilities.

Question 2.

What was the past background of college students with learning disabilities?

Hypothesis 2a.

College students with learning disabilities and indicators of learning disabilities have different past backgrounds than college students without learning disabilities and indicators of learning disabilities.

Hypothesis 2b.

College student with learning disabilities and indicators of learning disabilities with good academic performance in college have different past backgrounds than college students with learning disabilities and indicators of learning disabilities who have poor academic performance in college.

The variables addressing Hypotheses 2a and 2b are in Table 3.

Table 3

Variables Addressing Hypotheses 2a and 2b

| Instrument | Variable |
|---|---|
| Interview | Type of School |
| Interview | Changes in Type of School |
| Interview | Grade changed from Self-Contained Classroom |

Table 3 (continued)

| Instrument | Variable |
|---|---|
| Interview | Handedness |
| Interview | Mixed Dominence |
| Interview | Glasses |
| Interview | Physical Problems |
| Interview | Elementary School - Number of Areas Hard |
| Interview | Elementary Reading |
| Interview | Elementary Reading Method |
| Interview | Elementary Spelling |
| Interview | Elementary Handwriting |
| Interview | Elementary Coloring |
| Interview | Elementary Arithmetic |
| Interview | Elementary Physical Education |
| Interview | Elementary Music |
| Interview | Elementary Help |
| Interview | High School Learning |
| Interview | High School Academic Areas Hard |
| Interview | High School Reading |
| Interview | High School Writing Papers |
| Interview | High School Math |
| Interview | High School Science |
| Interview | High School Foreign Language |
| Interview | High School Physical Education |
| Interview | High School Help |

## Interview

### Type of School, Changes in Type of School, Grade Changed from Self-Contained Classroom

These three variables explored the school setting's influence in students with learning disabilities.

### Handedness, Mixed Dominance, Glasses, Physical Problems

These variables were included to provide information about physical characteristics associated with learning disabilities. Information came from observation and interview data.

### Elementary School: Number of Areas Hard, Elementary Reading, Elementary Reading Method, Elementary Spelling, Elementary Handwriting, Elementary Coloring, Elementary Arithmetic, Elementary Physical Education, Elementary Music, Elementary Help.

This cluster of variables probed the elementary school experience and whether it was easy or hard overall. Subjects were questioned whether they found reading easy or hard and the method by which they learned to read. Then, they were questioned whether these six areas in elementary school were easy or hard. The areas were spelling, handwriting, coloring, arithmetic physical education, and Music. A score was obtained for the number of academic areas (reading, spelling, handwriting, and arthimetic) that were hard in elementary school for each subject to obtain a total of academic areas hard for each subject. Also determined was whether or not each subject received extra help or assistance during elementary years.

High School Academic Areas Hard, High School Reading, High School Writing Papers, High School Mathematics, High School Science, High School Foreign Language, High School Physical Education, High School Help

The same areas explored for elementary school learning were studied with respect to junior-senior high school. The academic areas included in determining the variable, High School Academic Areas Hard, were reading, writing, papers, math, science, and foreign languages.

### Question 3

What is the college experience like for college students with learning disabilities?

### Hypothesis 3a

College students with learning disabilities and indicators of learning disabilities have different experiences in college than college students without learning disabilities and indicators of learning disabilities.

### Hypothesis 3b

College students with learning disabilities and indicators of learning disabilities who have good academic performance in college have different experiences in college than college students with learning disabilities and indicators of learning disabilities who have poor academic performance in college.

The variables available to test Hypotheses 3a and 3b can be found in Table 4.

Table 4

Variables Addressing Hypotheses 3a and 3b

| Instrument | Variable |
|---|---|
| Interview | College Help |
| Interview | College, Areas hard |
| Interview | College Reading |
| Interview | College Notes |
| Interview | College Objective Exams |
| Interview | College Essay Exams |
| Interview | College Writing Papers |
| Interview | College Oral Presentations |
| Interview | College Class Discussions |
| Time Log | Time Sleeping |
| Time Log | Time Studying |
| Time Log | Time Classes |
| Time Log | Time Leisure |
| Time Log | Time, Other |
| Time Log | Study Sessions/Week |
| Time Log | Length of Study Sessions |

Table 4 (continued)

| Instrument | Variable |
|---|---|
| Exam | Neat |
| Exam | Grammatical |
| Exam | Ideas |
| Exam | Spelling Rating |
| Paper | Organization |
| Paper | Neat |
| Paper | Grammatical |
| Paper | Ideas |
| Paper | Spelling Rating |

College Help, College Areas Hard, College Reading, College Notes, College Objective Exams, College Essay Exams, College Writing Papers, College Oral Presentations, College Class Discussion.

This set of variables probed areas of college functioning. Participants were first asked if college learning, overall, was easy or hard. They were also asked if they received any help in dealing with college work. The areas of reading, taking lecture notes, taking objective exams and essay exams, writing papers, doing oral presentations and class discussions were separately explored, and the sum of the number of areas that were perceived as hard became variables, college areas hard.

### Time Sleeping, Time Studying, Time Classes, Time Leisure, Time Other, Study Sessions Per Week, Length of Study Sessions

Use of time in college was explored through a time log of activities participants were requested to keep. These variables were thought to have possible significance in understanding learning for the study population. Study sessions per week were the number of different study sessions during which a subject studied in one week's time; the length of study sessions was computed by dividing the number of hours spent studying by the number of study sessions to obtain an average for each subject.

### Exam Neat, Exam Grammatical, Exam Ideas, Exam Spelling Rating

Each participant was asked to give the researcher an in-class essay-type exam done during college. Only the first five pages were used for the study. If an exam of shorter length was turned in, the numerical scores, such as spelling mistakes, were adjusted to a 5-page equivalent. These exams were rated by a Clark University English Department graduate student and writing tutor on the dimensions listed above. The exams were rated on a scale of 1 to 5, with 1 indicating excellent performance and 5 indicating poor performance. Spelling mistakes were counted once for each incorrect rendering.

Paper Organization, Paper Neat, Paper Grammatical, Paper Ideas, Paper Spelling Rating

Subjects were asked to turn in a typical paper done in college. Again, the first five pages were used. If the paper was of shorter length, the numerical scores, spelling mistakes and typographical errors, were converted to 5-page equivalents. The other categories were rated on a 1 to 5 scale with 1 indicating excellent performance and 5 indicating poor performance. The category of organization was added to those ratings used for the exams because greater development of ideas could occur in paper than an essay exam with several short-answer type questions. The rater for the exams also did the papers.

Question 4.

What coping strategies did college students with learning disabilities develop to deal with past schooling?

Hypothesis 4a.

College students with learning disabilities and indicators of learning disabilities developed different coping strategies in past learning than college students without learning disabilities.

Hypothesis 4b.

College students with learning disabilities and indicators of learning disabilities who have good academic performance in college developed different coping strategies in past learning than college students with learning disabilities and indicators of learning disabilities who have poor academic performance in college.

Variables addressing Hypotheses 4a and 4b are listed in Table 5.

Table 5

Variables Addressing Hypotheses 4a and 4b

| Instrument | Variable |
|---|---|
| Interview | Elementary, Method of Learning |
| Interview | Elementary, Method of Expression |
| Interview | Elementary, Kind of Help |
| Interview | High School, Method of Learning |
| Interview | High School, Kind of Help |

### Elementary Method of Learning, Elementary Method of Expression, Elementary Kind of Help

How subjects remembered learning in elementary school was probed by interview questions asking if learning was facilitated in small groups, and with visual or auditory presentation. Subjects were also asked how they remembered being able to express information, orally, in written work, and pictorally. In addition, if subjects received any kind of help in elementary school learning, they were asked to specify the kind and duration of such help. Additional qualitative information about coping strategies during elementary school years was available from the interview data.

### High School Method of Expression, High School Kind of Help

The areas of method of learning and kinds of help received in high school address coping strategies in the high school years.

In addition, qualitative data was available from the interview questions dealing with the elementary and high school years.

*Question 5*.

*What are the coping strategies college students with learning disabilities use to deal with college work*?

*Hypothesis 5a*.

*College students with learning disabilities and indicators of learning disabilities have different coping strategies to deal with college work than college students without learning disabilities and indicators of learning disabilities*.

*Hypothesis 5b*.

*College students with learning disabilities and indicators of learning disabilities who have good academic performance in college have different coping strategies to deal with college work than college students with learning disabilities and indicators of learning disabilities who have poor academic* performance in college.

The variables addressing Hypotheses 5a and 5b are presented in Table 6.

Table 6

Variables Addressing Hypotheses 5a and 5b

| Instrument | Variable |
|---|---|
| Interview | College, Kind of Help |
| Interview | College, Coping Strategies |
| Time Log | College, Use of Time |
| Interview | Coping Methods - Qualitative Descriptions |

## College Kind of Help

The kinds of help sought by participants were seen as one type of coping strategy. The various kinds of help students sought in college, such as help by friends, faculty, university resources, tutoring, and family help (and help by others) were explored.

## College Coping Strategies

Interview data concerning specific coping methods developed and used by subjects enabled analysis of coping strategies for subjects subgroups. In addition, qualitative information gathered during psychoeducational assessment was expected to be another means of exploring coping strategies and compensatory behavior.

### College Use of Time

Information from the time log was available for analysis as a possible coping strategy in college.

#### Question 6.

*What are the areas in which college students with learning disabilities are unable to learn?*

#### Hypothesis 6a.

*College students with learning disabilities and indicators of learning disabilities have more areas in which learning is blocked than college students without learning disabilities and indicators of learning disabilities.*

#### Hypothesis 6b.

*College students with learning disabilities and indicators of learning disabilities who have good academic performance in college have less areas in which learning is blocked than college students with learning disabilities and indicators of learning disabilities who have poor academic performance in college.*

The variables addressing Hypotheses 6a and 6b are presented in Table 7.

Table 7

Variables Addressing Hypotheses 6a and 6b

| Instrument | Variable |
|---|---|
| Interview | College, Learning Blocked |

### College Learning Blocked

During the interview, subjects were asked if there were any areas in which learning was blocked for them.

## The Sample

### Sample Selection Procedures

The definition of learning disabilities is problematic. Different definitions require differing criteria for students to be labeled learning disabled. Also, there is little research available on older students with learning disabilities and no studies which detail characteristics of college students with learning disabilities.

For the above reasons, a differentiated sample selection process was initiated. The study attempted to tap college students who had previously been diagnosed as learning disabled as well as those who exhibited indicators of possible learning disabilities.

The sample was collected in the following ways. (1) According to the Deans of Admissions and Students at Clark, there were approximately 25 Clark undergraduates who had been diagnosed as learning disabled before college entrance. The Dean of Students Office had a list of handicapped students on campus, including students with learning disabilities. She agreed to refer those students with learning disabilities to the author for possible participation in the study; nine students came from this source. (2) The author had served as a resource person for a group of Clark undergraduates who identify themselves as learning disabled or questioned having learning disabilities and had coordinated assessment, referral efforts and service delivery for these students as outlined in the pamphlet, "The Learning Disabled Student at Clark University." Some of these students came to the author through a parent's intervention before martriculation, a few came because of friends who had worked with the author, several were referred by faculty members, and two came as a result of the pamphlet, "The Learning Disabled Student at Clark University." These students approached the author for assistance due to having a suspected learning disability. These students were asked to participate in the study and 14 students came from this source. (3) Another route for solicitation of subjects was an article in the Scarlet, the undergraduate newspaper, which appeared in September 1981. The article asked for volunteers who felt they had a learning disability, or unusual learning styles, or problems in learning. Subjects obtained by this method came to the author of their own accord for the study but had not previously requested academic assistance. Two subjects were obtained in this manner. (4) Faculty assistance in referring students for the study was requested through a letter to faculty from the Dean of Students (see Appendix C). These students, unlike group two above never requested assistance due to learning problems, but were referred solely for participation in the study because faculty felt the students had unusual learning difficulties. The author gave a brief presentation at the faculty meeting in the fall of 1981 requesting referrals. In addition, the heads of the University writing center and math tutorial center were asked to refer students to the author. Two subjects were referred from this source. (5) Other subjects were expected to come from freshmen given a new University Writing Exam in September, 1981. Those freshman scoring below the established cut-off point were slated to recieve special instruction to improve writing skills at Clark University. These low-scoring students were to be asked to participate in the study. However, the writing exam was not given as planned. Therefore, the author met with instructors of Introductory Literature and Expository Writing classes to ask for referrals for the study. Two students came to participate in the study in this way. (6) To tap the population of college students who perform on psychoeducational measures as learning disabled and who have characteristics associated with learning disabilities but who may not have unusual difficulties with college work and who may not ever have been diagnosed as having difficulties, the author designed a brief questionnaire and administered it to students by visiting large undergraduate classes.

## The Questionnaire

The questionnaire (see Figure 5) was designed for this study to identify students with selected characteristics associated with learning disabilities and previous or current academic problems also frequently associated with learning disabilities. Ability in auditory sequencing (questions 1a and 1b) and visual-motor integration (questions 12 and 13) were included to tap problems in the auditory and visual processing channels. The tasks of remembering and writing digits forward and backward and copying two designs were chosen both for the type of task and for the ease of administration in a large group setting. Areas of previous or current academic difficulty, spelling (question 5), handwriting (questions 6 and 7), copying (question 8), and reading problems (question 9), were selected as areas of difficulty often associated with learning disabilities. Finally, questions 2-4 of the questionnaire were directed toward locating students possessing what the writer, with assistance from her adviser, has coined the "I could have done better" syndrome,

Figure 5

Brief Questionnaire

Name________________________ Year at Clark________ Sex ______

Box Number _________________ Major ___________________________

Phone ______________________

1a. _________________________ 1b. ___________________________

2. Academically, are you doing as well at Clark as you think you could be doing? Yes___ No___

3. Are you able to show all you know on exams? Yes___ No___

4. Do you feel you learn differently than others? Yes___ No___

5. Are you poor in spelling? Yes___ No___

6. Do you print when you do written work? Yes___ No___

7. Do you have extremely poor handwriting? Yes___ No___

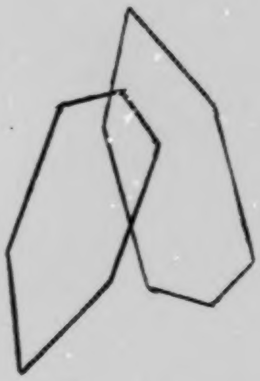
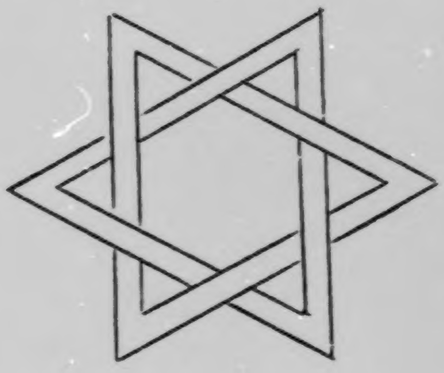
8. Do you have difficulty copying figures and designs? Yes___ No___

9. Have you ever had a reading problem? Yes___ No___

10. Have you ever been diagnosed as having a learning disability? Yes___ No___

11. Is your cumulative grade point average above 3.0? Yes___ No___

Please copy the following designs:

| | |
|---|---|
| 12.  | 13.  |
| 12. | 13. |

familiar to most university instructors. This syndrome manifests itself following the return of exams or papers to students. Some students will then be heard offering, "I could have done better if I had more time, I had a better schedule, etc." The author, seriously interested in how and why some students do perform better than others, wanted to explore the factors surrounding students who, within themselves, felt they could do better or felt they learned differently from others.

The author chose a variety of subject areas as well as ages of students in selecting classes in which to administer the questionnaire. The questionnaire was administered to seven classes during September 1981 and a total of 276 undergraduates completed it (see Table 8). It was again administered to two classes in November, 1981, to elicit more subjects.

Table 8

Record of Questionnaire Administration

| Date Given | Class | Subject | Instructor | No. of Clark Undergraduate Students |
|---|---|---|---|---|
| 9/4/81 | Ed 201.1 | The Child and the Educative Process | Zern | 32 |
| 9/4/81 | Bio 100 | Introductory Biology | Brink | 53 |

Table 8 (continued)

| Date Given | Class | Subject | Instructor | No. of Clark Under-graudate Students |
|---|---|---|---|---|
| 9/8/81 | Econ 101 Sec. 4 | Issues and Perspectives | Van Tassel | 59 |
| 9/10/81 | Scrn 101 | Introduction to Screen Studies | Hodgkinson | 55 |
| 9/15/81 | Geog. 165 | Simulating the City | Knos | 24 |
| 9/21/81 | Econ 205.1 Sec. 1 | Microeconomics | Veendorp | 18 |
| 9/21/81 | Econ 205.1 Sec. 2 | Microeconomics | Baker | 35 |
| 11/20/81 | Art 172.02 | Visual Studies | Kruger | 13 |
| 12/2/81 | Soc. 239 | Social Gerontology | Walsh | 24 |
| | | | TOTAL | 314 |

The items on the questionnaire were scored in the following way. A score of 1 was given to each incorrect recording of digits (questions 1a and 1b), indications of not performing as well as expected (questions 2 and 3), indication of learning different (question 4), problems in learning (questions 5-8), and incorrect copying of designs (questions 12 and 13) using the criteria in the Developmental Test of Visual-Motor Integration (Beery, 1967). Positive answers to questions 9 and 10 were scored as 2, being stronger indications of learning disabilities. Question 11, asking grade-point average, was included to assist in categorizing the sample. Actual grade-point averages for subjects were obtained later in the study from the University Registrar's Office.

Therefore, theoretically, scores on the questionnaire could range from 0 to 15, with the higher scores indicating problems thought to be associated with learning disabilities.

The results of the questionnaire were surprising to the author. Scores ranged from 0 to 12. The distribution of scores is given in Table 9.

Table 9

Scores on the Questionnaire

| Score | Number of Students |
|---|---|
| 0 | 8 |
| 1 | 35 |
| 2 | 45 |
| 3 | 69 |
| 4 | 54 |
| 5 | 45 |
| 6 | 26 |
| 7 | 10 |
| 8 | 7 |
| 9 | 7 |
| 10 | 3 |

Table 9 (continued)

| Score | | Number of Students |
|---|---|---|
| 11 | | 2 |
| 12 | | 3 |
| | Total | 34 |

Twelve students who took the questionnaire indicated that they had previously been diagnosed as having a learning disability. Thirty students indicated reading problems. Eighteen students missed both digit terms, and 21 students missed both drawing items.

The researcher solicited for participation in the study population students who exhibited at least one of the characteristics listed in Table 10.

Table 10

Criterion for Subject Solicitaton/LD Group

| Criterion | Number of Students Exhibiting Characteristics |
|---|---|
| Those diagnosed as learning disabled | 12 |
| Those scoring 7 or more in the questionniare | 32 |
| Those missing both digit questions | 18 |
| Those missing both drawings | 21 |

Students scoring 2 or less on the questionnaire and not missing any digit or drawing items, 27 students, were solicited for participation in the control group. Data concerning subject solicitation is summarized in Table 11.

Table 11

Summary of Subject Solicitation from Questionnaire

| Methods of Solicitation and Response | LD Group | Control Group |
|---|---|---|
| Note sent to solicit participation | 43 | 40 |
| Agreement to participate on bases of note | 5 | 8 |
| Follow-up phone calls to solicit participation | 35 | 31 |
| Final sample culled from questionnaire | 16 (scores 7 and greater) | 24 (scores 3 and under) |
| Students with diagnosed LD obtained from questionnaire | 12 | -- |

As of November 10, 1981, the researcher had obtained from all sources 48 students for the study population and 18 students for the control group. The questionnaire was administered to two additional classes in late November and early December, 1981 to secure more subjects.

The research encountered some difficulty in obtaining students for the control group. As of February 23, 1982 only 18 students were in the control group. Therefore, the control group category was expanded to include students obtaining a score of 3 on the questionnaire, and missing no digit or drawing items. An additional 6 control subjects joined the study in this way.

Subject participation was left open until May 1982 because the study did not reach the 90 student maximum. In April, 1982, a student previously diagnosed as learning disabled approached the author for assistance with law school applications. He had not heard of the study, and was asked to participate. In June 1981, a student taking a course with the author in the Education Department mentioned that she had dyslexia. The author was unable to make arrangements to have her tested in time for inclusion in the study. However, these last two examples seem to indicate that there are even more undergraudates with learning disabilities at Clark University than those included in the research. Every attempt was made in this research, short of sending a questionnaire to the entire campus, to publicize the study and secure participation for as many learning disabled students as possible. However, it is the author's firm feeling that the 26 students previously diagnosed as learning disabled are not the complete population, and that perhaps a number of students with learning disabilities equal in size or even greater in size than this group exists at Clark University. Twelve of the 25 students diagnozed a learning disabled came from the questionnaire administered to 314 undergraduates. If the other 1200 undergraduates at Clark had been approached and asked about learning disabilities, it seems logical that more LD students would have emerged. Table 12 indicates the categorization of the study population.

Table 12

Categorization of Subject Participation

| Category | Number of Subjects in Final Sample |
|---|---|
| Diagnosed LD previously | 25 |
| Indicators of LD | 32 |
| (Severe Writing Problems | 2) |
| (Self-referred | 9) |
| (Referred via article | 2) |
| (Faculty-referred | 2) |
| (Questionnaire | 17) |
| Control Subjects from Questionnaire | 24 |

## Personnel Assisting with the Study

### Consultant Meeting

The researcher met with one consultant, Dr. Gertrude Webb, in October, 1981 for one day. The focus of the meeting was refinement of the study design, especially the development of strategies for collecting and analyzing work products. The consultant also provided alternative interview schedules and suggestions in sequencing interview questions.

## The Research Assistants

### Training

Prior to the first training session, the researcher distributed copies of the grant proposal to the research assistants. The researcher met with the three research assistants October 8, 1981. The researcher covered administrative details and established a place in an Education Department Office to house all materials. The revised Wechsler Adult Intelligence Scale (WAIS-R) kits were demonstrated, and the research assistants were instructed to familiarize themselves with the kits and to bring questions to the next meeting. The group decided to meet every two weeks during data collection to facilitate information sharing and optimum management of the project.

The research assistants reviewed the interview form. It was decided to ask subjects for permission to tape record the interview. If students gave any indication of being uncomfortable, taping was not to be used. Two students expressed reservations, and their interviews were not tape recorded. The research assistants then discussed ideas for systematically recording qualitative data from the Bender and WAIS. The researcher subsequently prepared a form for use in the study (see Appendix D).

The order for giving the assessments was decided upon as:

1. Bender Visual Motor Gestalt Test
2. Wechsler Adult Intelligence Scale - Revised
3. Interview

The following procedures were established to ensure a standard experience.

Bender Gestalt: Research assistants were to note the time needed to complete the designs. Only one sheet of paper was to be given for the Bender, but if a subject asked for more or was short of space, additional sheets could be given. The Bender was to be scored using the Koppitz system. The prepared form was to be used for qualitative data.

WAIS-R: Again, the prepared form was to be used for qualitative data. At the end of testing, the research assistants were to ask about processing for subtests of particular difficult or where unusual coping seemed to occur. The research assistants gave suggestions for particular areas to note in responses to the WAIS. The researcher then incorporated these suggestions into the record form.

Interview: It was decided to review the interview form after it was given several times. Research assistants were instructed to use identification numbers for all protocols, interview forms and notes. Also, they were instructed to give out no scores, but if students insisted, to refer them to the researcher.

The researcher assigned 10 students to each research assistant to begin testing. Research assistants were to contact the subjects themselves and arrange mutually convenient testing times.

At the second research assistant meeting, October 20, 1981, research assistants expressed reservations about using the interview schedule. One problem was time; interviews were running as long as 2 hours when they were intended to be 30 minutes in length. Another difficulty was the format of the form it self. After discussion of possible remedies, it was decided to collapse the questions about the junior and senior high scool years into one section. Questions about type of schooling and changes in schooling were added, as were new questions about coping strategies. The basic areas of the original interview schedule remained unchanged. The researcher revised the interview form. The 6 students who had been interviewed using the original form were contacted by the researcher to answer the additional questions. Both original and revised interview forms appear in Appendix A.

The researcher assigned additional subjects to the three research assistants as subjects consented to participate.

By November 17, one research assistant had tested only 4 of her assigned subjects. The researcher was quite concerned because of the subjects' upcoming Thanksgiving vacation followed by preparation for final exams. This research assistant had encountered unforeseen extra duties at her job that prevented her from testing the remainder of her assigned subjects. At a meeting with the project advisor, it was decided to proceed with the study using only one research assistant to complete the remainder of the assessments. From that date on, the researcher was in close contact with this research assistant concerning the assigned subjects and discussion of results. Weekly meetings were held with the research assistant, except during winter vacation, from December, 1981, through the completion of data collection in May, 1982. The number of subjects tested by each research assistant appear in Table 13.

Table 13

Number of Subjects Tested by Each Research Assistant

| | |
|---|---|
| Research Assistant 1 | 5 subjects |
| Research Assistant 2 | 10 subjects |
| Research Assistant 3 | 65 subjects |

## The Research Aides

### Training

The two research aides for the project were juniors at Clark University who had performed exceptionally well in their sophomore Education courses. They were recommended by the project advisor. The research aides joined the study September 10, 1981, and read the grant proposal before their first scheduled meetings with the researcher During the first training session, September 18,1981, the researcher gave an overview of the study and answered the aides questions. The research aides were then trained in scoring the Brief Questionnaire, using the manual from the Developmental Test of Visual-Motor Integration as the standard for scoring the two drawing items. As the questionnaires were administered, they were given to the aides for scoring. Any questionnaires which were difficult to score were marked with a question mark for the researcher to check. The researcher distributed the manuals for the Wide Range Achievement Test and the Gates-MacGinitie Reading Tests for the aides to read.

At the second meeting, September 25, 1981, the aides presented the scored questionnaires. The problem ones were discussed and gone over as a training technique. More questionnaires were distributed for scoring. The researcher demonstrated the proper administration of the Wide Range Achievement Test and the Gates-MacGinitie Reading Tests. The research aides were assigned to practice giving the directions for these two tests to each other, and when they were at ease with proper administration, to give each test to a fellow student not involved in the study.

At the third meeting, October 1, 1981, the research aides brought their completed protocols and the researcher instructed them in proper scoring and recording procedures.

The researcher also explained the Test of Adolescent Language (TOAL) to the research aides and demonstrated the directions and correct procedures for administering each of the eight subtests. The research aides were assigned practice administrations of the TOAL during the following week. Subsequent meetings with the research aides focussed upon the logistics of test administration, scheduling, and any questions that arose in scoring specific protocols.

## Data Collection

The research aides and researcher established ten time slots for subjects to complete the group tests necessary for the study beginning October 22, 1981. It was decided to administer the Wide Range Achievement Test and Gates-MacGinitie Reading Tests at one sitting (called Session 1) and the Test of Adolescent Language at another sitting (called Session 2). The research aides, at the group testing sessions, were to schedule an additional half-hour session with each subject for administration of the three TOAL subtests which were to be individually administered. A memo was sent to all participants as of October 26, 1981 about the scheduled sessions. All memos appear in Appendix E.

The response to the scheduled group testing sessions was poor. Therefore, five additional dates were established for November 17-December 2, 1981 and a memo was distributed to all students. This time, subjects were asked to return a slip to the researcher indicating which session they would attend or indicating their chosen times on a sign-up sheet in the researcher's office. Phone calls were also made to remind students of the testing sessions. This memo also reminded students about the paper, exam, and time log subjects were supposed to give to the researcher.

Many subjects neglected to turn in time logs, papers and exams. They were sent several memos reminding them to turn in their work products. Only 36 subjects submitted time logs in the week requested, Nov. 16, 1981. The other 26 students who did eventually complete the time logs used other weeks of the semester, or the next semester.

By the end of the fall semester, 1981, only 28 students had completed Session 1, Session 2 and their individual testing of the TOAL and 29 subjects had returned time logs. Therefore, another memo was waiting for subjects when they returned from winter vacation, reminding them of missing items and establishing more testing dates. An additional memo was circulated January 22, 1982, establishing a Saturday testing date. The memos became increasingly aggressive as time passed and subjects were reminded that their $20.00 participant fee would not be paid until all individual and group testing sessions were completed. February 3, 1982, the researcher circulated two memos to subjects, one memo to subjects who had partially completed the testing and one memo to subjects who had done no testing. Accompanying these memos were phone calls to as many students who could be reached.

As of February 9, 1982 49 students had completed all individual and group testing. At this point, it was decided that the research aides would individually schedule appointments with subjects at mutual convenience. One research aide sustained a head injury during a basketball game in February, and she was unable to assist in data collection and scoring efforts for a period of 1-1/2 months. Therefore, the researcher began scheduling some appointments with subjects who had not completed the required group and individual tests. Data collection actually continued thrugh May 1982. Several students proved quite a challenge to reach. For example, one student, previously diagnosed as LD, required 20 different appointments (18 of which he missed or cancelled) before he completed the testing. While he was the most difficult case, 15 subjects cancelled and/or missed three or more appointments. Two students, despite repeated phone calls, memos, etc., never did the group assessments. Therefore, the scheduling and administration of the assessments proved much more time consuming than originally envisioned by the researcher. The final numbers of subjects completing each assessment and work product appear in Table 14.

Table 14

Number of Subjects Completing Each Assessment

| Name of Assessment | Number of Students Completing Assessment |
|---|---|
| WAIS-R | 80 (#49 missing, LD students) |
| Interview | 80 (#4[illegible] missing, LD students) |
| Bender-Gestalt | 80 (#49 missing, LD students) |
| TOAL | 79 (#34 and 39 missing, LD students) |
| WRAT | 79 (#34 and 39 missing, LD students) |
| Gates-MacGinitie | 78 (#34, 37, and 39 missing, LD students) |
| Time Log | 62 (41 LD; 21 control) |
| Paper | 59 (44 LD, 19 control) |
| Exam | 58 (38 LD, 20 control) |

How the group tests were administered and scored appear in Table 15. Due to the scheduling complications, as discussed, it was impossible to follow projected plans of test administration and scoring.

Table 15

Administration and Scoring of Group Tests

| Assessment | Total Subjects Taking Test | Research Aide 1 |  | Research Aide 2 |  | Researcher |  |
|---|---|---|---|---|---|---|---|
|  |  | Gave | Marked | Gave | Marked | Gave | Marked |
| TOAL |  |  |  |  |  |  |  |
| Group Admin. | 79 | 20 | 38 | 41 | 41 | 18 | 0 |
| Indiv. Admin. | 79 | 20 | 36 | 39 | 42 | 20 | 1 |
| WRAT | 79 | 10 | 38 | 45 | 41 | 24 | 0 |
| Gates-MacGinitie | 78 | 11 | 41 | 50 | 37 | 17 | 0 |

## Data Scoring Considerations

### Test of Adolescent Language

Protocals from the Wide Range Achievement Test and the Gates-MacGinitie Reading Tests were easily scored from the test manuals. Protocols from the Test of Adolescent Language were more difficult to score. Of the eight TOAL subtests, five were easily scored using the manual. However, three subtests, speaking vocabulary, writing vocabulary and writing/grammar relied upon examine judgment. Despite training in scoring techniques and practice trials, the research aides continued to have difficulty with two subtests. Therefore, additional training was conducted in scoring these subtests. An inter-rater reliability analysis was done on ten protocols of the three subtests, and inter-rater agreement, by subtest, ranged from 96 percent to 100 percent. However, the researcher wanted an expert opinion. Therefore, a language specialist was hired to independently rate the same protocols used for the inter-rater reliability check. The expert ratings ranged from 87 percent to 96 percent agreement with 29 scores of research aides. The scores used were the original ones given by the first research aide assigned to score the TOAL. Therefore, of the 10 tests used for inter-rater reliability, 5 scores were those give by the first research aide and 5 scores were those give by the second research aide.

## Other Personnel Assisting in Data Analysis

The research aides, after training, begun doing ratings of the exam. When results of their scoring were compared, the researcher realized that the aides were not experienced enough in judging assignments to do the task properly. Therefore, a Clark University writing center tutor, a graduate student, was selected to rate the papers and exams. The rating sheet appears in Appendix D.

Because of the large number of variables tested and multiple comparisons needed on each variable, the researcher sought statistical consultation. Rather than using the services of the specialist on college students with learning disabilities as originally proposed, the remaining consultation funds were directed toward statistical help. An educational statistical specialist was hired to help with the statistical design. She also did the required computer work. Because of the consultants expertise and years of experience as Assistant Director of the Boston University Computing Center, the data was run at Boston University Computing Center.

# CHAPTER 4

# RESULTS

The results section first describes how the sample was categorized for data analysis purposes. Then, each hypothesis and the variables addressing each hypothesis are presented separately. Qualitative data about coping strategies is presenting in a separate section following discussion of Hypothesis 5b.

## Categorization of the Sample

The sample was categorized into four subgroups according to possession of a learning disability or indicators of learning disabilities and grade point average.

The range of participants' grand point averages was 1.63 to 3.67 (A equals 4 points, B equals 3 points, etc.), with the mean grade point average being 2.86. Therefore, the four sub-groups were:

Group 1:

College students with learning disabilities and indicators of learning disabilities who have good academic performance in college.

N = 28
GPA = 2.87 to 3.67

Group 2:

College students with learning

N = 29
GPA = 1.63 to 2.85

disabilities and indicators of learning disabilities who have poor academic performance in college.

Group 3:

College students with no indicators of learning disabilities who have good academic performance in college.

N = 14
GPA = 2.86 to 3.60

Group 4:

College students with no indicators of learning disabilities who have poor academic performance in college.

N = 10
GPA = 1.91 to 2.75

In addition the LD group was recategorized into three sections for further selected data analysis:

Highest Academic Performance LD N = 18 GPA = 2.98-3.67
Middle Academic Performance LD N = 20 GPA = 2.71-2.94
Lowest Academic Performance LD N = 19 GPA = 1.68-2.68

The distribution of grade point averages for each sample subgroup appears in Appendix G.

### Hypothesis 1a.

*College students with learning disabilities and indicators of learning disabilities perform poorer on psychoeducational assessments than college students without learning disabiities and indicators of learning disabilities.*

### Comparison of LD and Control Subjects

Analyses of variance were used to compare the entire population of learning disabled students with the entire population of control subjects on the variables of the psychoeducational assessments.

The variables which were tested for Hypothesis 1a and their significance appear in Table 16.

These results indicate that college students with learning disabilities and indicators of learning disabilities do perform differently on some psychoeducational assessments than college students without learning disabilities. The learning disabled subjects differed from the nondisabled subjects at a significance level of .05 on 17 of 39 different variables culled from the psychoeducational assessments. In addition, differences in the .05 to .10 significance range, more than expected by chance, were found for five variables.

It must be noted that 39 variables are not all independent of each other. The variables from the WAIS-R are grouped to generate the five WAIS factor scores. The WAIS-R memory

## Table 16

## All LD Compared to All Control Subjects on Variables of Psychoeducational Assessments†

| Variable | LD[a] Mean[b,c] | Control Mean[b,c] | F | Sig. Level of F |
|---|---|---|---|---|
| WAIS-R Overall IQ | 109.75 | 115.92 | 4.831 | .031** |
| WAIS-R Verbal IQ | 111.21 | 115.88 | 2.953 | .090* |
| WAIS-R Perf. IQ | 105.07 | 111.50 | 3.534 | .063* |
| WAIS-R Diff V/P IQ | 11.71 | 9.46 | 1.045 | .310 |
| WAIS-R Scatter Score | 6.95 | 5.88 | 6.319 | .014** |
| WAIS-R Information | 10.43 | 11.50 | 4.362 | .040** |
| WAIS-R Digit Span | 10.75 | 12.46 | 1.031 | .001*** |
| WAIS-R Vocabulary | 11.11 | 11.75 | 2.311 | .133 |
| WAIS-R Arithmetic | 10.64 | 11.33 | 1.374 | .245 |
| WAIS-R Comprehension | 12.04 | 11.33 | 1.225 | .272 |
| WAIS-R Similarities | 11.30 | 11.00 | .358 | .551 |
| WAIS-R Picture Completion | 10.54 | 10.46 | .024 | .878 |
| WAIS-R Picture Arrangement | 10.98 | 11.83 | 1.939 | .168 |
| WAIS-R Block Design | 10.50 | 11.75 | 3.855 | .053* |
| WAIS-R Object Assembly | 10.48 | 10.96 | .473 | .493 |
| WAIS-R Digit Symbol | 10.39 | 11.75 | 4.794 | .032*** |
| WAIS-R Bannatyne Spatial | 10.51 | 11.06 | 1.061 | .306 |
| WAIS-R Bannatyne Sequencing | 10.71 | 12.01 | 13.736 | .000*** |

Table 16 (continued)

| Variable | LD$^a$ Mean$^{b,c}$ | Control Mean$^{b,c}$ | F | Sig. Level of F |
|---|---|---|---|---|
| WAIS-R Bannatyne Verbal Conc. | 11.48 | 11.36 | .099 | .753 |
| WAIS-R Bannatyne Acq. Know. | 10.73 | 11.53 | 4.770 | .032** |
| WAIS-R ACID | 10.55 | 11.76 | 16.002 | .000*** |
| WAIS-R Memory | 7.60 | 8.04 | 1.302 | .258 |
| Bender Score | .43 | .13 | 3.100 | .082* |
| TOAL ALQ | 112.71 | 121.08 | 4.462 | .038** |
| TOAL Listening | 100.89 | 107.88 | 1.498 | .225 |
| TOAL Speaking | 114.65 | 118.25 | .804 | .373 |
| TOAL Reading | 115.22 | 117.54 | .393 | .533 |
| TOAL Writing | 112.22 | 124.83 | 6.442 | .013** |
| TOAL Spoken Language | 108.62 | 115.38 | 2.345 | .130 |
| TOAL Written Language | 115.62 | 124.79 | 5.198 | .025** |
| TOAL Vocabulary | 116.56 | 125.58 | 4.730 | .033** |
| TOAL Grammar | 107.62 | 114.79 | 2.616 | .110 |
| TOAL Receptive Language | 109.35 | 114.96 | 1.602 | .209 |
| TOAL Expressive Language | 113.85 | 125.25 | 8.530 | .005*** |
| WRAT Spelling | 103.11 | 111.71 | 12.412 | .001*** |
| WRAT Math | 99.11 | 111.67 | 14.936 | .000*** |
| Gates Vocab. | 72.09 | 79.63 | 4.575 | .036** |

Table 16 (continued)

| Variable | LD[a] Mean[b,c] | Control Mean[b,c] | F | Sig. Level of F |
|---|---|---|---|---|
| Gates Comp. | 68.04 | 74.58 | 3.086 | .083* |
| Gates Overall | 71.17 | 78.42 | 5.422 | .023** |

* $p < .10$
** $p < .05$
*** $p < .005$

[a] Subjects taking each assessment:

|  | LD | Control | Total |
|---|---|---|---|
| WAIS | 56 | 24 | 80 |
| Bender | 56 | 24 | 80 |
| TOAL | 55 | 24 | 79 |
| WRAT | 55 | 24 | 79 |
| Gates | 54 | 24 | 78 |

[b] Mean figures given as standard scores with the exception of Gates scores, which are percentiles.

[c] Due to space limitations, standard deviations of the psychoeducational assessments appear in Appendix G, Table 16a.

[†] One-tailed tests were used in this table and all analysis of variance.

score is drawn from the Digit Symbol subtest, and the WAIS-R difference between Verbal and Performance Intelligence Quotients and the Scatter Score utilize the individual subtest scores. For the TOAL, the scores given are quotients derived from two or four separate subtest scores. And the Gates-MacGinitie Overall Score sums the two other Gates scores. Therefore, the total number of differences found must be interpreted with the notion of overlapping scores in mind.

Ten of the differences between the learning disabled and control populations occurred in the 22 variables related to the WAIS. Learning disabled subjects had lower overall IQ's than controls, and also showed wider scatter than controls. Learning disabled subjects also showed a trend of having lowered Verbal and Performance IQs.

Clements, Lehtinen and Lukens (1964) cite one typical pattern of children with minimal brain dysfunction as wide scatter in either or both scales of the Wechsler and lowered scores in Arithmetic, Block Design, Object Assembly, Digit Span, Coding and Mazes. The college students with learning disabilities in the present study exhibit more scatter than control subjects, and significantly lowered scores in three of the six subtests used by Clements, Lehtinen, and Lukens, Digit Span, Block Design, and Digit Symbol. In addition, significant differences in two of Bannatyne's recategorization factors, Sequencing Ability (comprising Digit Span, Arithmetic and Coding) and Acquired Knowledge (Information, Arithmetic, Vocabulary) may indicate that combined factor scores yield more useful information in viewing LD college students. The lowered Digit Span and Digit Symbol scores as well as the lowered Sequencing Ability Factor scores for the LD subjects point to problems in sequencing tasks for college students with LD. The Acquired Knowledge score, composed of Information, Arithmetic, and Vocabulary scores, is significantly lower for the LD group when compared to controls while these three subtest scores viewed separately are not significantly different for the two groups. The lowered Acquired Knowledge score suggests that LD students do not pick up information as automatically from their environments or do not retain such information as clearly as controls. The WAIS-R ACID Score, the combined scores of the Arithmetic, Digit Symbol, Information and Digit Span subtests is also significantly lower for the LD group, another indication of how LD college students are similar to younger students with learning disabilities.

That learning disabled students at Clark are not significantly different from controls in the Verbal Conceptualization Ability and Spatial Ability factors may in fact point to the LD students' strengths in verbal reasoning and abstract spatial reasoning and shed light on the nature of their coping abilities.

The Similarities subtest is often used as a good indicator of verbal abstract thinking and the Block Design subtest as an indictor of nonverbal abstract thinking. The learning disabled students do not differ significantly on the Similarities subtest from controls; however, they do differ from controls on the Block Design subtest, perhaps indicating no impairment in verbal abstraction but relative weaknesses in nonverbal abstraction and/or spatial abilities.

The difference between LD and control groups on the Bender is not surprising, indicating the persistence of perceptual-motor integration problems into the college years. The overall TOAL score as well as 4 of 10 possible language quotients were significantly different for the learning disabled and control groups. LD students were deficient, when compared to controls, in understanding and analyzing written language, generating correct sentences, knowledge of vocabulary words, and ability to express throughts orally and in writing. Learning disabled subjects showed significant differences in mathematics achievement and in reading vocabulary, reading comprehension and overall reading ability when compared with control subjects, indicating that problems with academic achievement do continue into the college years for some LD students.

Hypothesis 1b.

College students with learning disabilities and indicators of learning disabilities who have good academic performance in college perform the same on psychoeducational assessments as college students with learning disabilities and indicators of learning disabilities who have poor academic performance in college.

## Comparison of Good and Poor Academic Performance LD Subjects

A one-way analysis of variance was used to compare the results of the psychoeducational assessments for the good academic performance LD group compared to the poor academic performance LD group. The variables and significance levels for this analysis appear in Table 17.

Only two differences in the psychoeducational assessments were found to be significant at the .05 level when the good academic performance and poor academic performance subjects were compared, and one additional variable was significant between the .05 and .10 significance level. Two of the three differences were found in the Gates-MacGinitie Reading Tests and the third on the ACID Factor of the WAIS-R. Caution concerning certain statistical differences occurring by chancge is germaine to these findings of only a few differences occurring from 39 ANOVAs. Therefore, at first examination it would seem that Hypothesis 1b is true, that LD col-

Table 17

All Good Academic Performance LD Students Compared to All Poor Academic Performance LD Students on the Variables of the Psychoeducational Assessments

| Variable | Good Academic Performance[a] LD Mean[b,c] | Poor Academic Performance[a] LD Mean[b,c] | F | Sig. Level of F |
|---|---|---|---|---|
| WAIS-R Overall IQ | 110.39 | 109.10 | .171 | .681 |
| WAIS-R Verbal IQ | 112.96 | 109.46 | 1.329 | .254 |
| WAIS-R Perf. IQ | 104.86 | 105.29 | .013 | .911 |
| WAIS-R Diff V/P IQ | 12.46 | 10.96 | .334 | .566 |
| WAIS-R Scatter Score | 7.18 | 6.71 | .927 | .340 |
| WAIS-R Information | 10.86 | 10.00 | 2.245 | .140 |
| WAIS-R Digit Span | 11.11 | 10.39 | 1.547 | .219 |
| WAIS-R Vocabulary | 11.18 | 11.04 | .077 | .783 |
| WAIS-R Arithmetic | 10.89 | 10.39 | .577 | .451 |
| WAIS-R Comprehension | 12.36 | 11.71 | .713 | .402 |
| WAIS-R Similarities | 11.57 | 11.04 | .749 | .391 |
| WAIS-R Picture Completion | 10.57 | 10.50 | .011 | .915 |
| WAIS-R Picture Arrangement | 10.82 | 11.15 | .214 | .646 |
| WAIS-R Block Design | 10.50 | 10.50 | 0.000 | 1.000 |

Table 17 (continued)

| Variable | Good Academic Performance$^a$ LD Mean$^{b,c}$ | Poor Academic Performance$^a$ LD Mean$^{b,c}$ | F | Sig. Level of F |
|---|---|---|---|---|
| WAIS-R Object Assembly | 10.29 | 10.68 | .217 | .643 |
| WAIS-R Digit Symbol | 10.79 | 10.00 | 1.386 | .244 |
| WAIS-R Bannatyne Spatial | 10.45 | 10.56 | .031 | .861 |
| WAIS-R Bannatyne Sequencing | 10.90 | 10.51 | 1.058 | .308 |
| WAIS-R Bannatyne Verbal Comp. | 11.70 | 11.26 | .692 | .409 |
| WAIS-R Bannatyne Acq. Know. | 10.98 | 10.48 | 1.360 | .249 |
| WAIS-R ACID | 10.91 | 10.19 | 4.671 | .035** |
| WAIS-R Memory | 7.56 | 7.64 | .039 | .845 |
| Bender Score | .39 | .46 | .108 | .744 |
| TOAL ALQ | 114.27 | 111.31 | .433 | .513 |
| TOAL Listening | 103.62 | 98.45 | .663 | .419 |
| TOAL Speaking | 114.88 | 114.45 | .010 | .922 |
| TOAL Reading | 114.65 | 115.72 | .068 | .795 |
| TOAL Writing | 114.77 | 109.93 | .858 | .359 |
| TOAL Spoken Language | 110.23 | 107.17 | .358 | .552 |
| TOAL Written Language | 116.35 | 114.97 | .094 | .761 |
| TOAL Vocabulary | 118.12 | 115.17 | .400 | .530 |

Table 17 (continued)

| Variable | Good Academic Performance[a] LD Mean[b,c] | Poor Academic Performance[a] LD Mean[b,c] | F | Sig. Level of F |
|---|---|---|---|---|
| TOAL Grammar | 109.12 | 106.24 | .315 | .577 |
| TOAL Receptive Language | 111.04 | 107.83 | .433 | .514 |
| TOAL Expressive Language | 114.58 | 113.21 | .093 | .762 |
| WRAT Spelling | 105.38 | 101.07 | 2.566 | .115 |
| WRAT Math | 100.54 | 97.83 | .679 | .414 |
| Gates Vocab. | 75.73 | 68.71 | 3.409 | .071* |
| Gates Comp. | 71.35 | 64.96 | 2.760 | .103 |
| Gates Overall | 75.27 | 67.34 | 5.739 | .020** |

* $p < .10$
** $p < .05$

[a] Subjects taking each assessment:

|  | Good Academic Performance LD | Poor Academic Performance LD | Total LD |
|---|---|---|---|
| WAIS | 28 | 28 | 56 |
| Bender | 28 | 28 | 56 |
| TOAL | 26 | 29 | 55 |
| WRAT | 26 | 29 | 55 |
| Gates | 26 | 28 | 54 |

[b] Mean figures given as standard scores with the exception of Gates scores, which are percentiles.

[c] Due to space limitations, standard deviations of the psychoeducational assessments appear in Appendix G, Table 17a.

lege students with good academic performance are essentially the same psychoeducationally as LD college students with poor academic performance. However, although other variables were not significantly different when good and poor academic performance LD subjects were compared on the psychoeducational assessments, two patterns do emerge. The poor academic performance LD subjects have better scores on only 8 of 39 variables. The good academic performance LD subjects have better scores on 31 of 39 variables, two which are statistically different. While the other scores are not statistically different, they do indicate a strong pattern such that good academic performance subjects have better performance on psychoeducational assessments than poor academic performance LD subjects.

## Pattern of Better WAIS-R Performance Scores for Poor Academic Performance LD Subjects

The poor academic performance LD subjects have better scores than good academic performance LD subjects in 8 variables, WAIS-R Performance IQ, WAIS-R Difference Verbal/Performance Score, WAIS-R Scatter Score, WAIs-R Picture Arrangement, WAIS-R Object Assembly, WAIS-R Bannatyne Spatial Factor, WAIS-R Memory Score, and TOAL Reading Score. Four of these differences deal with performance abilities on the WAIS-R.

## Pattern of Psychoeducational Variables for Good and Poor Academic Performance LD Subjects

With the exception of the 8 variables listed above, good academic performance LD subjects have numerically better scores than poor academic performance LD subjects in 31 of 39 variables of the psychoeducational assessments. These variables are in the areas of verbal abilities, language abilities, and overall academic achievement.

## Comparisons of Highest and Lowest Academic Performance LD Subjects

Examination of the data using only the highest and poorest academic achievement LD students and eliminating the middle group, yields more differences than when good and poor academic LD subjects are compared.

The results of comparing the highest academic achievement LD subjects to the poorest academic achivement subjects using a one-way analysis of variance appear in Table 18.

A total of five variables are significant at the .05 level and 6 additional variables fall into the .05 to .10 significance range in the comparisons of highest to poorest academic performance LD groups. The variables which are significantly different between the two groups are the WAIS-R Digit Span, WAIS-R ACID Score, Gates Vocabulary Score, Gates Comprehension Score, and Gates Total Score. Thus, thirty-four variables do not show statistical differences between

## Table 18

## Highest Academic Performance LD Subjects Compared to Lowest Academic Performance Subjects on Variables of the Psychoeducational Assessments

| Variable | Highest LD$^a$ Mean$^{b,c}$ | Lowest LD$^a$ Mean$^{b,c}$ | F | Sig. Level of F |
|---|---|---|---|---|
| WAIS-R Overall IQ | 112.05 | 106.61 | 1.871 | .180 |
| WAIS-R Verbal IQ | 115.00 | 108.67 | 2.55 | .119 |
| WAIS-R Perf. IQ | 105.84 | 101.00 | 1.03 | .317 |
| WAIS-R Diff V/P IQ | 14.33 | 12.44 | .305 | .585 |
| WAIS-R Scatter Score | 7.68 | 6.56 | 3.94 | .055* |
| WAIS-R Information | 10.89 | 10.72 | .057 | .813 |
| WAIS-R Digit Span | 11.31 | 9.89 | 5.887 | .021** |
| WAIS-R Vocabulary | 11.00 | 10.67 | .253 | .618 |
| WAIS-R Arithmetic | 10.84 | 9.83 | 1.59 | .216 |
| WAIS-R Comprehension | 13.21 | 11.28 | 3.939 | .055* |
| WAIS-R Similarities | 12.00 | 10.72 | 3.04 | .090* |
| WAIS-R Picture Completion | 10.79 | 10.33 | .266 | .609 |
| WAIS-R Picture Arrangement | 10.74 | 10.44 | .103 | .750 |
| WAIS-R Block Design | 10.63 | 9.50 | 1.84 | .183 |
| WAIS-R Object Assembly | 10.15 | 9.89 | .061 | .807 |
| WAIS-R Digit Symbol | 11.05 | 9.61 | 2.787 | .104 |
| WAIS-R Bannatyne Spatial | 10.53 | 9.91 | .624 | .435 |

Table 18 (continued)

| Variable | Highest LD[a] Mean[b,c] | Lowest LD[a] Mean[b,c] | F | Sig. Level of F |
|---|---|---|---|---|
| WAIS-R Bannatyne Sequencing | 11.04 | 9.98 | 4.907 | .033 |
| WAIS-R Bannatyne Verbal Conc. | 12.07 | 10.89 | 3.061 | .089* |
| WAIS-R Bannatyne Acq. Know. | 10.91 | 10.40 | .754 | .391 |
| WAIS-R ACID | 11.03 | 10.01 | 5.546 | .024** |
| WAIS-R Memory | 7.50 | 7.67 | .094 | .761 |
| Bender Score | .47 | .56 | .070 | .794 |
| TOAL ACQ | 114.37 | 106.17 | 2.45 | .127 |
| TOAL Listening | 102.57 | 94.50 | 1.241 | .273 |
| TOAL Speaking | 116.58 | 111.44 | .870 | .357 |
| TOAL Reading | 114.53 | 109.67 | .890 | .352 |
| TOAL Writing | 115.79 | 105.50 | 2.883 | .098* |
| TOAL Spoken Language | 110.63 | 103.28 | 1.58 | .217 |
| TOAL Written Language | 116.84 | 108.44 | 2.506 | .122 |
| TOAL Vocabulary | 117.74 | 109.61 | 2.30 | .130 |
| TOAL Grammar | 109.74 | 101.39 | 1.670 | .205 |
| TOAL Receptive Language | 109.79 | 102.22 | 1.656 | .207 |
| TOAL Expressive Language | 117.11 | 108.67 | 2.528 | .121 |
| WRAT Spelling | 105.32 | 98.33 | 3.879 | .057* |

Table 18 (continued)

| Variable | Highest LD[a] Mean[b,c] | Lowest LD[a] Mean[b,c] | F | Sig. Level of F |
|---|---|---|---|---|
| WRAT Math | 102.37 | 96.67 | 1.757 | .194 |
| Gates Vocab. | 76.27 | 65.47 | 5.78 | .022** |
| Gates Comp. | 70.53 | 60.36 | 4.38 | .044** |
| Gates Overall | 75.32 | 63.36 | 9.281 | .005** |

* $p$ < .10
** $p$ < .05

[a] Subjects taking each assessment:

| | Highest LD | Lowest LD |
|---|---|---|
| WAIS | 19 | 18 |
| Bender | 19 | 18 |
| TOAL | 19 | 18 |
| WRAT | 19 | 18 |
| Gates | 19 | 17 |

[b] Mean figures given as standard scores with the exception of Gates scores, which are percentiles.

[c] Due to space limitations, standard deviations of the psychoeducational assessments appear in Appendix G, Table 18a.

highest and lowest academic performance LD groups. However, there is a pattern such that the highest academic performance subjects have better scores on 36 of 39 of the psychoeducational variables. Another pattern is of highest lowest academic performance LD subjects having a wider range of scatter on the WAIS-R than the lowest acdemic performance LD subjects. Therefore, reexamination of the data partially supports Hypothesis 1b. Highest and lowest academic performance LD subjects differ on 5 variables and have a pattern of other differences.

### Comparisons of Control, Highest Academic Peformance LD and Lowest Academic Perforamnce LD Subjects

Additional data analysis was undertaken to locate possible patterns or trends. When control, highest academic performance LD, and lowest academic performance LD subjects were compared, several interesting findings emerge. These findings concern the range of subtest scatter on the WAIS-R, strengths in verbal conceptualization for the highest academic performance LD subjects, and an overall pattern of scores for the three subgroups. The mean scores for the control, highest academic perforamnce LD and lowest academic performance LD groups appear in Table 19.

### Scatter Score and High Scores by Highest Academic LD Subjects

The WAIS Scatter Score is significantly different when

## Table 19

Comparisons of Control, Highest Academic Performance LD and Poorest Academic Performance LD subjects on the Variables of the Psychoeducational Assessments

| Variable | Control Mean (N=24) | Highest Aca. Perf. LD (N=19) Mean | Lowest Aca. Perf. LD (N=18) Mean |
|---|---|---|---|
| WAIS-R Overall IQ | 115.92 | 106.61 | 112.06 |
| WAIS-R Verbal IQ | 115.88 | 115.00 | 108.67 |
| WAIS-R Perf. IQ | 115.50 | 105.84 | 101.00 |
| WAIS-R Diff V/P IQ | 9.46 | 14.33 | 12.44 |
| WAIS-R Scatter Score | 5.88 | 7.08 | 6.56 |
| WAIS-R Information | 11.50 | 10.89 | 10.72 |
| WAIS-R Digit Span | 12.46 | 11.31 | 9.89 |
| WAIS-R Vocabulary | 11.75 | 11.00 | 10.67 |
| WAIS-R Arithmetic | 11.33 | 10.84 | 9.83 |
| WAIS-R Comprehension | 11.33 | 13.21 | 11.28 |
| WAIS-R Similarities | 11.00 | 12.00 | 10.72 |
| WAIS-R Picture Completion | 10.46 | 10.79 | 10.33 |
| WAIS-R Picture Arrangement | 11.83 | 10.74 | 10.44 |
| WAIS-R Block Design | 11.75 | 10.63 | 9.50 |
| WAIS-R Object Assembly | 10.96 | 10.15 | 9.89 |
| WAIS-R Digit Symbol | 11.75 | 11.05 | 9.61 |
| WAIS-R Bannatyne Spatial | 11.06 | 10.53 | 9.91 |

Table 19 (continued)

| Variable | Control Mean (N=24) | Highest Aca. Perf. LD (N=19) Mean | Poorest Aca. Perf. LD (N=18) Mean |
|---|---|---|---|
| WAIS-R Bannatyne Sequencial | 12.01 | 11.04 | 9.98 |
| WAIS-R Bannatyne Verbal Conc. | 11.36 | 12.07 | 10.89 |
| WAIS-R Bannatyne Acq. Know. | 11.53 | 10.91 | 10.40 |
| WAIS-R ACID | 11.76 | 11.03 | 10.01 |
| WAIS-R Memory | 8.04 | 7.50 | 7.67 |
| Bender Score* | .13 | .47 | .56 |
| TOAL ALQ | 121.08 | 114.37 | 106.17 |
| TOAL Listening | 107.88 | 105.50 | 94.50 |
| TOAL Speaking | 118.25 | 116.58 | 111.44 |
| TOAL Reading | 117.54 | 114.53 | 109.17 |
| TOAL Writing | 124.23 | 115.79 | 105.50 |
| TOAL Spoken Language | 115.38 | 110.63 | 103.28 |
| TOAL Written Language | 124.79 | 116.84 | 108.44 |
| TOAL Vocabulary | 125.58 | 117.74 | 109.61 |
| TOAL Grammar | 114.79 | 109.74 | 101.39 |
| TOAL Receptive Language | 114.96 | 109.79 | 102.22 |
| TOAL Expressive Language | 125.25 | 117.11 | 108.67 |
| WRAT Spelling | 111.71 | 105.32 | 98.33 |

Table 19 (continued)

| Variable | Control Mean (N=24) | Highest Aca. Perf. LD (N=19) Mean | Poorest Aca. Perf. LD (N=18) Mean |
|---|---|---|---|
| WRAT Math | 111.67 | 102.37 | 96.67 |
| Gates Vocab. | 79.63 | 76.27 | 65.47 |
| Gates Comp. | 74.58 | 70.53 | 60.36 |
| Gates Overall | 78.42 | 75.32 | 63.35 |

*A score of 0 on the Bender is the best, or normal score. Therefore, controls have the best score, highest academic performance LD subjects have the middle score, and lowest academic performance LD subjects have the worst Bender score.

LD and control groups are compared and when good and poor academic performance LD subjects are compared. However, the direction of the differences is in opposition to the general pattern observed. The mean Scatter Score for control subjects is 5.88; it is 7.08 for highest academic performance LD subjects and 6.56 for lowest academic performance LD subjects. That LD students exhibit a wider range of profile scatter ($\underline{p}$=.014) than control subjects is not surprising; a hallmark of learning disabilities is discrepancy among various abilities. However, the highest academic performance Ld subjects shows a strong trend (($\underline{p}$=.055) toward having a wider range between highest and lowest WAIS-R subtests than lowest academic performance LD subjects. Further examination of the data concerning higher scores for the highest academic performance LD subjects on selected WAIS variables helps explain the higher scatter score for the highest academic performance LD subjects.

## Higher Verbal Conceptualization Scores for Highest Academic Performance LD Subjects

The mean scores on three WAIS-R subtests, Comprehension, Similarities, and Picture Completion, are higher for highest academic LD subjects when compared to control subjects. Also, the Bannatyne Verbal Conceptualization factor mean scores show a pattern of being higher for the highest academic performance subjects when compared to control subjects. These variables conform to a pattern of highest scores for highest academic performance LD subjects, middle scores for control subjects, and lowest scores for lowest academic performance LD subjects. That the highest academic performance LD subjects have better scores than controls on these variables is contrary to the prediction of LD subjects having poorer performance than controls. The highest academic performance LD subjects possess clear strengths in verbal conceptual ability. The mean comprehension score, 13.21, for the highest academic performance groups is the highest mean subtest score on the WAIS attained by any subgroup. Highest academic performance LD subjects have the widest range of subtest scatter of all groups due to high score on some subtests and low scores on others.

### Overall Patterns

High verbal conceptual ability of the highest academic performance LD subjects contrasts with the trend toward lowered scores for the highest academic achievement LD group when compared to controls on the other WAIS-R variables, the variables concerning reading and mathematics achievement, visual motor integration, and the quotients and scores measuring language functioning.

Even including the exceptions noted above, 32 of the 39 variables of the psychoeducational assessments, far more than would have occurred by chance, show a pattern of best scores for control subjects, middle scores for the highest academic achievement LD subjects, and lowest scores for the lowest academic performance LD subjects.

## Concluding Comments

The analysis of scores by distinct subgroups on the psychoeducational assessments leads to differing results, depending upon the subgroups compared. One important finding of the present research of college students with learning disabilities is that there are clear differences between LD and control subjects on the results of psychoeducational assessments. Learning disabled and control subjects differ on almost half of the psychoeducational variables tested, with these differences centering on LD students showing a wider range of scatter on the WAIS than controls and LD students having lowered scores on sequencing and visual-motor tasks, understanding and analyzing written language, expressive language abilities, and mathematics and reading achievement. No differences between the total LD group and control subjects were found on verbal conceptualization abilities and receptive language abilities; areas which may be particularly important to adequate college achievement for LD students.

In addition, significant differences and patterns emerge when subgroups of the learning disabled population are compared to each other and to control subjects. When the LD subjects are split into two groups for comparison, good and poor academic performance subjects, a pattern toward the good academic performance LD subjects having the better scores on 31 of 39 variables is apparent. However, the poor academic performance LD subjects exhibit a pattern of better scores on four performance areas of the WAIS-R.

Further examination of the psychoeducational data, this time by comparing the highest and lowest academic achievement LD subjects, yields several findings and patterns. The highest academic achievement LD subjects have significantly higher reading, vocabulary and achievement scores, higher scores in auditory memory and higher scores on the ACID factor than the lowest academic achievement LD subjects. Also, there is a pattern of higher scores on all but one variable by highest academic performance LD subjects when compared to lowest academic performance LD subjects. When subgroups of the learning disabled population are compared to each other and to control subjects, an important finding is that the highest academic performance LD college students possess a cluster of strengths in verbal conceptual abilities and that they exhibit a wider range of scaled scores on the WAIS than any other subgroup of subjects. These findings highlight the importance of studying learning disabled subjects by specific groups according to identified characteristics. Several significant findings and trends in the present research only emerged when the learning disabled population studied was divided into three subgroups according to academic achievement in college.

Hypothesis 2a.

College students with learning disabilities and indicators of learning disabilities have different past backgrounds than college students without learning disabilities and indicators of learning disabilities.

## Comparisons of LD and Control Subjects

The data for past academic background and physical characteristics was examined for trends and analyzed by chi-square analysis to compare learning disabled and control groups.

### Academic Background

The interview data concerning type of school, changes in type of school, grade changed from self-contained classroom, academic areas hard in elementary school, help received in elementary school, academic areas hard in high school, and help received in high school for LD and control subjects appears in Table 20.

There were no significant differences between LD and control subjects on type of school, changes in school, and grade changed from self-contained classroom. However, the results show that learning disabled students had significantly more areas of academic difficulty in elementary and high school than control subjects and that learning disabled students received significantly more academic assistance in ele-

## Table 20

### Past Academic Background of LD and Control Subjects[†]

| | LD (N=56) | Control (N=24) | $X^2$ | Sig. Level of $X^2$ |
|---|---|---|---|---|
| **Type of School** | | | | |
| Public | 27 | 15 | 1.39 | n.s. |
| Public and Private | 29 | 9 | | |
| **Changes in Type of School** | | | | |
| Changes in type of school | 29 | 8 | 2.61 | n.s. |
| No changes in type of school | 27 | 16 | | |
| **Grade Changed from Self-Contained Classroom** | | | | |
| Grades 3-6 | 22 | 8 | <1 | n.s. |
| Grades 7-9 | 27 | 14 | | |
| Didn't Know | 7 | 2 | | |
| **Academic Areas Hard, Elem. School** | | | | |
| 0-1 Areas | 18 | 22 | 23.80 | <.001 |
| 2-4 Areas | 38 | 2 | | |
| **Help, Elem. School** | | | | |
| 0-1 Kinds of Help | 35 | 22 | 6.96 | <.01 |
| 2-5 Kinds of Help | 21 | 2 | | |
| **Academic Areas Hard, High School** | | | | |
| 0-1 Areas | 12 | 18 | 20.57 | <.001 |
| 2-5 Areas | 44 | 6 | | |
| **Help, High School** | | | | |
| 0-1 Kinds of Help | 35 | 21 | 5.00 | <.05 |
| 2-5 Kinds of Help | 21 | 3 | | |

[†] Two-tailed tests were used here and in all chi-square analysis.

mentary and high school than control subjects. That LD students had more areas of academic difficulty than control subjects is not surprising. However, that LD students received significantly more help during both elementary and secondary years is an interesting finding, especially when considering that these college students started elementary school before the current mandated special education services were available. Perhaps the early recognition of learning problems and continued supportive academic services given to students with learning disabilities and indicators of learning disabilities are key to successful college performance for this population. Interview data about kinds of help and coping strategies will further elucidate this point.

## Physical Characteristics

The variables concerning physical characteristics were explored to ascertain possible differernces beween LD and control subjects. The results of the comparisons between LD and control subjects in handedness, mixed dominance, wearing glasses and physical problems appear in Table 21.

No variables were significant at the .05 level using a two-tailed test. Although not statistically significant the college LD group had more left-handed members and more reports of mixed dominance and more members wearing glasses than the control group. Left-handedness and mixed dominance are often

Table 21

Comparison of LD and Control Subjects on Physical Characteristics

| | LD (N=56) | Control (N=24) | $X^2$ | Sig. Level of $X^2$ |
|---|---|---|---|---|
| **Handedness** | | | | |
| Left | 13 | 1 | 3.01* | <.10 |
| Right | 43 | 23 | | |
| **Mixed Dominance** | | | | |
| Yes | 24 | 5 | 3.43 | <.10 |
| No | 32 | 19 | | |
| **Wearing Glasses** | | | | |
| Yes | 26 | 16 | 2.75 | <.10 |
| No | 30 | 8 | | |
| **Physical Problems** | | | | |
| Yes | 9 | 1 | 1.42 | n.s. |
| No | 47 | 23 | | |

* Yates correction used

associated with younger learning disabled students. These findings support the notion that the LD subgroup for this study, although not all formally diagnosed as learning disabled, do conform to characteristics of learning disabled populations.

Therefore, Hypothesis 2a is not supported by statistical analysis, but there are trends toward differences between LD and Control groups in past background.

Hypothesis 2b.

College students with learning disabilities and indicators of learning disabilities with good academic performance in college have different past backgrounds than college students with learning disabilities and indicators of learning disabilities who have poor academic performance in college.

### Comparison of Good and Poor Academic LD Subjects

As discussed in the results for Hypothesis 2a, chi-square analyses were used to test this hypothesis. The variables analyzed by chi-square analysis included those addressing past academic background and physical characteristics.

The LD group was split into two halves by GPA, and the good academic performance LD subjects were compared to the poor academic performance subjects on the variables concerning past academic background and physical characteristics. Then, the data was reexamined comparing the highest and lowest academic performance LD groups and excluding the middle academic performance LD group.

## Academic Background

Interview data concerning type of school, changes in type of school, grade changed from self-contained classroom, academic areas hard in elementary school, help received in elementary school, academic areas hard in high school, and help received in high school appears in Table 22.

There were no significant differences between the good and poor academic performance LD groups on any of the variables concerning past academic background.

## Physical Characteristics

The variables which compared the good and poor academic performance LD subjects on physical background appear in Table 23.

There were no significant differences in physical background when good and poor academic performance LD subjects are compared. Therefore, the comparison of good and poor academic performance LD subjects on past academic background and physical characteristics fails to support Hypothesis 2b. No significant differences in past background were found when the two LD subgroups were compared on the variables concerning past background.

## Table 22

## Past Academic Background of Good and Poor Academic Performance LD Subjects

| | Good Aca. Perf. LD (N=28) | Poor Aca. Perf. LD (N=28) | $X^2$ | Sig. Level of $X^2$ |
|---|---|---|---|---|
| **Type of School** | | | | |
| Public | 15 | 17 | <1 | n.s. |
| Public and Private | 13 | 11 | | |
| **Changes in Type of School** | | | | |
| Changes in type of school | 12 | 17 | 1.78 | n.s. |
| No changes in type of school | 16 | 28 | | |
| **Grade Changed from Self-Contained Classroom** | | | | |
| Grades 3-6 | 11 | 11 | <1 | n.s. |
| Grades 7-9 | 15 | 12 | | |
| Didn't Know | 2 | 5 | | |
| **Academic Areas Hard, Elem. School** | | | | |
| 0-1 Areas | 10 | 8 | <1 | n.s. |
| 2-4 Areas | 18 | 20 | | |
| **Help, Elem. School** | | | | |
| 0-1 Kinds of Help | 17 | 18 | <1 | n.s. |
| 2-5 Kinds of Help | 11 | 20 | | |
| **Academic Areas Hard, High School** | | | | |
| 0-1 Areas | 7 | 5 | <1 | n.s. |
| 2-5 Areas | 21 | 23 | | |
| **Help, High School** | | | | |
| 0-1 Kinds of Help | 18 | 17 | <1 | n.s. |
| 2-5 Kinds of Help | 10 | 11 | | |

Table 23

Physical Background of Good and Poor Academic Performance LD Subjects

| | Good Aca. Perf. LD (N=28) | Poor Aca. Perf. LD (N=28) | $X^2$ | Sig. Level of $X^2$ |
|---|---|---|---|---|
| Handedness | | | | |
| Left | 6 | 7 | <1 | n.s |
| Right | 22 | 21 | | |
| Mixed Dominance | | | | |
| Yes | 10 | 14 | 1.16 | n.s. |
| No | 18 | 14 | | |
| Wearing Glasses | | | | |
| Yes | 14 | 12 | <1 | n.s. |
| No | 14 | 16 | | |
| Physical Problems | | | | |
| Yes | 6 | 3 | 1.20 | n.s. |
| No | 22 | 25 | | |

## Comparison of Highest and Lowest Academic Performance LD Subjects

The data was reexamined comparing the highest academic performance LD subjects on the variables concerning past background to see if any differences did occur.

### Academic Background

The variables addressing past academic background for highest and lowest academic performance LD subjects appear in Table 24.

No significant differences emerged in comparing past academic background of highest and lowest academic performance LD subjects.

### Physical Characteristics

The variables addressing physical characteristics of highest and lowest academic performance LD subjects appear in Table 25.

Therefore, no significant differences occurred in physical characteristics of highest and lowest academic performance LD subjects.

Comparison of background and physical characteristics of good and poor academic performance LD subjects and highest and lowest academic performance LD subjects failed to yield any significant differences. Therefore, Hypothesis 2b is not supported.

Table 24

Past Academic Background of Highest and Lowest Academic Performance LD Subjects

| | Highest Aca. Perf. LD (N=19) | Lowest Aca. Perf. LD (N=18) | $X^2$ | Sig. Level of $X^2$ |
|---|---|---|---|---|
| Type of School | | | | |
| Public | 13 | 9 | 1.31 | n.s. |
| Public and Private | 6 | 9 | | |
| Changes in Type of School | | | | |
| Changes in type of school | 6 | 10 | 2.13 | n.s. |
| No changes in type of school | 13 | 8 | | |
| Grade Changed from Self-Contained Classroom | | | | |
| Grades 3-6 | 6 | 8 | <1 | n.s. |
| Grades 7-9 | 12 | 8 | | |
| Didn't Know | 1 | 2 | | |
| Academic Areas Hard, Elem. School | | | | |
| 0-1 Areas | 7 | 5 | <1 | n.s. |
| 2-4 Areas | 12 | 13 | | |
| Help, Elem. School | | | | |
| 0-1 Kinds of Help | 13 | 10 | <1 | n.s. |
| 2-5 Kinds of Help | 6 | 8 | | |
| Academic Areas Hard, High School | | | | |
| 0-1 Areas | 6 | 4 | <1 | n.s. |
| 2-5 Areas | 13 | 14 | | |
| Help, High School | | | | |
| 0-1 Kinds of Help | 13 | 13 | <1 | n.s. |
| 2-5 Kinds of Help | 6 | 5 | | |

Table 25

Comparison of Highest and Lowest Academic Performance LD subjects appear in Table 25

| | Highest Aca. Perf. LD (N=19) | Lowest Aca. Perf. LD (N=18) | $X^2$ | Sig. Level of $X^2$ |
|---|---|---|---|---|
| Handedness | | | | |
| Left | 3 | 4 | <1 | n.s. |
| Right | 16 | 14 | | |
| Mixed Dominance | | | | |
| Yes | 8 | 10 | <1 | n.s. |
| No | 11 | 18 | | |
| Wearing Glasses | | | | |
| Yes | 8 | 6 | <1 | n.s. |
| No | 11 | 12 | | |
| Physical Problems | | | | |
| Yes | 4 | 2 | <1 | n.s. |
| No | 15 | 16 | | |

### Hypothesis 3a.

College students with learning disabilities and indicators of learning disabilities have different experiences in college than college students with learning disabilities and indicators of learning disabilities.

The variables addressing Hypothesis 3a include the various academic tasks undertaken by college students, such as reading, note-taking, objective exams, essay exams, papers, oral presentations and class discussions. Then, the variables of areas hard in college and amount of help received in college are discussed. Finally subjects are compared on the results of the time logs, exams and papers which they made available for the research.

## Comparison of LD and Control Subjects

### College Tasks

Learning disabled and control subjects were compared on interview data concerning college reading, note-taking, objective exams, essay exams, papers, oral presentations and class discussions. The results for these variables appear in Table 26.

The majority of subjects, both LD and control, did report that the various college academic tasks were easy for them. However, significantly more LD students reported that college reading, objective exams, essay exams, and college papers were

Table 26

Comparison of LD and Control Subjects on Academic Tasks in College

| | LD (N=56) | Control (N=24) | $X^2$ | Sig. Level of $X^2$ |
|---|---|---|---|---|
| Reading, Easy | | | | |
| Yes | 36 | 22 | 6.31 | <.05. |
| No | 20 | 2 | | |
| Notes, Easy | | | | |
| Yes | 42 | 21 | 1.56 | n.s. |
| No | 14 | 3 | | |
| Objective Exams, Easy | | | | |
| Yes | 40 | 23 | 5.97 | <.05 |
| No | 16 | 1 | | |
| Essay Exams, Easy | | | | |
| Yes | 39 | 22 | 4.50 | <.05 |
| No | 17 | 2 | | |
| Papers, easy | | | | |
| Yes | 30 | 22 | 10.72 | <.01 |
| No | 26 | 2 | | |
| Oral Presentations, Easy | | | | |
| Yes | 41 | 21 | 2.29 | n.s. |
| No | 13 | 2 | | |
| Didn't Know | 2 | 1 | | |
| Discussions, Easy | | | | |
| Yes | 42 | 20 | <1 | n.s. |
| No | 14 | 4 | | |
| Academic Areas Hard, College | | | | |
| 0-1 Areas | 22 | 22 | 9.13 | <.01 |
| 2-5 Areas | 34 | 2 | | |
| Help, College | | | | |
| 0-1 Areas | 38 | 18 | <1 | n.s. |
| 2-5 Areas | 18 | 6 | | |

difficult than control subjects, and the total number of academic areas found hard in college was significantly different for LD and control subjects. No significant differences between LD and control groups wre found on reported ease of note-taking, doing oral presentations, and participation in class discussions.

While LD college students do report significantly more academic areas hard than control subjects, LD college students do not significantly differ from controls in the total of kinds of help they report receiving in college. This finding may be explained in several ways. First, Clark University does not provide the specialized reading, study skills, and tutorial help that was available to many LD students in the elementary and high school years. Therefore, if more sources of help were available, perhaps LD students would utilize that help, and the findings might be different. Secondly, control subjects report seeking more help in college than they had in elementary and high school, thereby reducing the differences in help received when the LD and control subjects were compared in earlier schooling. In elementary and high school, no more than three control subjects reported utilizing more than two kinds of help; in college, six control subjects report seeking more than one kind of assistance. Thirdly, the summation of kinds of help utilized by LD and control subjects may obscure different patterns of help utilized by college students with learning disabilities when compared to control subjects. Differences in different kinds of help reported in college are discussed under Hypothesis 5a, which deals with college coping strategies.

## Time Log, Exam, and Paper

Analysis of variance was used to compare all learning disabled with all control subjects on the variable of the time log, exam, and paper. The results appear in Tables 27 and 28.

There were no significant differences in use of time for LD and control subjects. On the ratings of papers and exams, LD subjects had lower ratings in 4 out of 9 possible ratings, significant at the .05 level. Three differences occurred on the rating of exams, on the variables of neatness, ideas and spelling, and one difference surfaced on the papers, on the variable of grammar. It would seem, then, that for both the in-class exam situation and the take-home paper, LD students perform less adequately in some areas in comparison to non-disabled peers. Time pressure, having exams written whereas most papers are typed, reliance upon memory, and inability to utilize other resources may all contribute to making the in-class essay exam more difficult for LD students to negotiate than other aspects of college work. Interview data in which LD students reported significantly more trouble with

## Table 27

## All LD Compared to All Control on Hours/Week Listed in Time Log

| Variable | Mean LD (N=56) | SD | Mean Control (N=24) | SD | F | Sig. Level of F |
|---|---|---|---|---|---|---|
| Time Log Sleep | 59.46 | 7.69 | 58.48 | 6.52 | .309 | 0.581 |
| Time Log Study | 30.90 | 14.25 | 27.00 | 9.53 | 1.22 | 0.273 |
| Time Log Classes | 12.51 | 4.59 | 12.48 | 2.89 | .001 | 0.995 |
| Time Log Leisure | 36.41 | 15.40 | 37.33 | 13.62 | .046 | 0.831 |
| Time Log Study Sessions | 10.78 | 4.10 | 11.05 | 4.59 | .063 | 0.792 |
| Time Log Length Study Sessions | 3.00 | 1.12 | 2.65 | .81 | 1.519 | 0.223 |

Note: Numbers of subjects turning in the time log were:

| | LD (N=56) | Control (N=24) |
|---|---|---|
| Time log | 41 | 21 |

## Table 28

### All LD Compared to All Control on Ratings of Exam and Paper

(Rating Scale 1 to 5; 1 = excellent performance
5 = poorest performance)

| Variable | Mean LD | SD | Mean Control | SD | F | Sig. Level of F |
|---|---|---|---|---|---|---|
| Exam Neat | 3.13 | 1.04 | 2.50 | 1.12 | 4.849 | .032** |
| Exam Grammatical | 3.18 | .90 | 3.05 | 1.10 | .173 | .679 |
| Exam Ideas | 3.18 | 1.06 | 2.40 | 1.27 | 5.938 | .018** |
| Exam Spelling | 3.24 | 1.10 | 2.25 | 1.03 | 11.510 | .001** |
| Paper Organization | 3.19 | 1.01 | 2.63 | 1.09 | 3.705 | .059* |
| Paper Neat | 2.05 | .68 | 1.79 | .86 | 1.560 | .217 |
| Paper Grammatical | 3.25 | .78 | 2.47 | 1.00 | 10.305 | .002** |
| Paper Ideas | 2.89 | 1.06 | 2.37 | 1.16 | 2.590 | .112 |
| Paper Spelling | 2.52 | 1.21 | 2.32 | 1.16 | .309 | .581 |

* $p < .10$

** $p < .05$

Note: Numbers of subjects turning in exams, and papers were:

| Instrument | LD (N=56) | Control (N=24) |
|---|---|---|
| Exam | 38 | 20 |
| Paper | 44 | 19 |

both in-class essay exams and papers than control subjects correlates with the analysis of work products. These findings show that college students with learning disabilities, like their younger counterparts, continue to experience difficulty with certain aspects of academic work in college, especially work requiring written output. It is also interesting to note that differences in the rating of ideas occur between LD and control subjects in the in-class essay exam situation, but not in the paper situation, to indicate the importance of method of expression in facilitating success for LD students.

### Hypothesis 3b.

College students with learning disabilities and indicators of learning disabilities who have good academic performance in college have different experiences in college than college students with learning disabilities and indicators of learning disabilities who have poor academic performance in college.

The variables addressing Hypothesis 3b include the various academic tasks performed by college students, the total number of areas hard and help received in college, and the results of the time log, paper and exams. Two types of comparisons are presented. First there is the comparison of good and poor academic LD subjects on all variables in this section. Then, the data is reexamined using only the highest and lowest academic performance LD subjects.

## Comparison of Good and Poor Academic Performance LD Subjects

### College Tasks

Good and poor academic LD subjects were compared on interview data concerning the various academic tasks and number of academic areas hard and kinds of help received in college. The results appear in Table 29.

Therefore, on the various tasks and modes of performance in college, good and poor academic performance LD subjects differed only on the variable reported ease of doing papers at the .05 level of significance. Significantly more learning disabled college students with poor academic performance say that doing papers is hard for them than subjects in the good academic performance LD group. Learning disabled students with good academic performance in college experience less academic areas hard than the poor academic performance subjects. However, there are no significant differences on the different kinds of help reported received by the two groups.

### Time Log, Exam, and Paper

Analysis of variance were used to compare good and poor academic performance LD subjects on the variables of the time log, paper and exam. The results appear in Table 30 and 31.

There were no significant differences or trends found in comparing good and poor academic performance LD subjects on the time log and the ratings of the exam. However, the spell-

## Table 29

### Comparison of Good and Poor Academic LD Subjects on Academic Tasks in College

| | Good Aca. Perf. LD (N=28) | Poor Aca. Perf. LD (N=28) | $X^2$ | Sig. Level of $X^2$ |
|---|---|---|---|---|
| Reading, Easy | | | | |
| Yes | 18 | 18 | 6.3 | n.s. |
| No | 10 | 10 | | |
| Notes, Easy | | | | |
| Yes | 24 | 18 | 3.43 | <.10. |
| No | 4 | 10 | | |
| Objective Exams, Easy | | | | |
| Yes | 22 | 18 | 1.40 | n.s. |
| No | 6 | 10 | | |
| Essay Exams, Easy | | | | |
| Yes | 21 | 18 | .76 | n.s. |
| No | 7 | 10 | | |
| Papers, easy | | | | |
| Yes | 20 | 10 | 7.18 | <.01 |
| No | 8 | 18 | | |
| Oral Presentations, Easy | | | | |
| Yes | 20 | 21 | .74 | n.s. |
| No | 6 | 7 | | |
| Discussions, Easy | | | | |
| Yes | 21 | 21 | .58 | n.s. |
| No | 7 | 7 | | |
| Didn't Know | 2 | 0 | | |
| Academic Areas Hard, College | | | | |
| 0-1 Areas | 15 | 7 | 4.78 | <.05 |
| 2-5 Areas | 13 | 21 | | |
| Help, College | | | | |
| 0-1 Areas | 20 | 18 | .32 | n.s. |
| 2-5 Areas | 8 | 10 | | |

## Table 30

## All Good Academic Performance LD Compared to All Poor Academic Performance LD on Hours/Week Listed in the Time Log

| Variable | Good Academic Performance LD (N=28) | | Poor Academic Performance LD (N=28) | | F Ratio | Sig. Level of F |
|---|---|---|---|---|---|---|
| | mean | std | mean | std | | |
| Time Log Sleep | 61.52 | 7.74 | 58.52 | 7.20 | 3.267 | .954 |
| Time Log Study | 30.24 | 12.96 | 29.79 | 15.81 | 0.091 | .954 |
| Time Log Classes | 12.38 | 4.85 | 12.45 | 4.43 | 0.034 | .926 |
| Time Log Leisure | 38.81 | 18.62 | 36.10 | 11.81 | 1.042 | .767 |
| Time Log Study Sessions | 10.91 | 3.67 | 11.24 | 4.51 | 0.891 | .521 |
| Time Log Length Study Sessions | 3.05 | 1.16 | 2.86 | 1.10 | 0.076 | .836 |

Note: Number of subjects turning in the time log were:

| | Good Aca. Perf. LD (N=28) | Poor Aca. Perf. LD (N=20) |
|---|---|---|
| Time log | 21 | 20 |

## Table 31

### All Good Academic Performance LD Compared to All Poor Academic Performance on Ratings of the Exam and Paper

(Rating Scale 1 to 5; 1 = excellent performance, 5 = poor performance)

| Variable | Good Academic Performance LD (N=28) | | Poor Academic Performance LD (N=28) | | *F* Ratio | Sig. Level of F |
|---|---|---|---|---|---|---|
| | mean | std | mean | std | | |
| Exams Neat | 3.35 | 1.09 | 2.89 | 0.96 | 1.892 | .178 |
| Exams Grammatical | 3.00 | 0.79 | 3.39 | 0.98 | 1.824 | .185 |
| Exams Ideas | 3.15 | 1.14 | 3.22 | 1.00 | 0.043 | .837 |
| Exams Spelling | 3.15 | 1.09 | 3.73 | 6.14 | 0.257 | .615 |
| Paper Organization | 3.18 | 1.10 | 3.19 | 0.93 | 0.001 | .977 |
| Paper Neat | 1.86 | 0.56 | 2.24 | 0.75 | 3.310 | .076* |
| Paper Grammatical | 3.00 | 0.76 | 3.50 | 0.74 | 4.915 | .032** |
| Paper Ideas | 2.68 | 1.17 | 3.09 | 0.92 | 1.669 | .205 |
| Paper Spelling | 2.05 | 1.09 | 3.00 | 1.15 | 7.949 | .007** |

* *p* < .10

** *p* < .05

ing and grammar ratings were significant different when the two groups were compared on papers. Ideas and organization on papers show no differences. Perhaps the good academic performance LD subjects utilize the extra time allowed on papers and put more time and effort into the mechanical aspects of papers than the poor academic performance LD subjects. Interview data presented in a later section seems to confirm this idea.

## Comparison of Highest and Lowest Academic Performance LD Subjects

The data addressing Hypothesis 3b was reexamined comparing the highest and lowest academic performance LD subjects.

### College Tasks

The comparison of reported college functioning by highest and lowest academic performance LD subjects appears in Table 32.

The highest and lowest academic performance subjects differed significantly on reports of doing papers and essay exams in college. More of the lowest academic performance LD subjects reported trouble with papers than the highest academic performance LD subjects. No other differences between the two groups were found in reported ease of college tasks.

There is a trend toward the lowest academic performance LD subjects reporting more kinds of help received in college

## Table 32

## Comparison of Highest and Lowest Academic Performance LD Subjects on Academic Tasks in College

| | Highest Aca. Perf. LD (N=19) | Lowest Aca. Perf. LD (N=18) | $X^2$ | Sig. Level of $X^2$ |
|---|---|---|---|---|
| Reading, Easy | | | | |
| Yes | 12 | 13 | <1 | n.s. |
| No | 7 | 5 | | |
| Notes, Easy | | | | |
| Yes | 17 | 12 | 1.65 | n.s. |
| No | 2 | 6 | | |
| Objective Exams, Easy | | | | |
| Yes | 15 | 13 | <1 | n.s. |
| No | 4 | 5 | | |
| Essay Exams, Easy | | | | |
| Yes | 14 | 6 | 5.95 | <.05 |
| No | 5 | 12 | | |
| Papers, easy | | | | |
| Yes | 14 | 6 | 5.95 | <.05 |
| No | 5 | 12 | | |
| Oral Presentations, Easy | | | | |
| Yes | 13 | 16 | <1 | n.s. |
| No | 4 | 2 | | |
| Discussions, Easy | | | | |
| Yes | 14 | 17 | 1.57 | n.s. |
| No | 5 | 1 | | |
| Academic Areas Hard, College | | | | |
| 0-1 Areas | 11 | 4 | 1.60 | n.s. |
| 2-5 Areas | 8 | 14 | | |
| Help, College | | | | |
| 0-1 Areas | 13 | 7 | 3.42 | <.10 |
| 2-5 Areas | 6 | 11 | | |

than students in the highest academic performance LD group. Information about specific kinds of help received in college, discussed as part of hypothesis 5b on college coping strategies, may further explicite these trends in areas hard and kinds of help utilized in college that are reported by LD subjects.

## Time Log, Exam and Paper

Analysis of variance was used to compare the highest and lowest performance LD subjects on the variables of the time log, exam and paper. The results appear in Tables 33 and 34.

There were no differences on the variables of the time log and exam when highest and lowest academic performance LD subjects were compared. However, the papers showed the highest and lowest academic performance LDF subjects significantly different on ratings of grammar and a trend toward differences in spelling. The same explanation is posed as for the comparison of good and poor academic performance LD subjects; the lack of time pressures enable LD subjects to use strategies to overcome problems with spelling and grammar for the paper situation. The highest academic performance LD subjects seem to take advantage of that extra time to rewrite, revise, or seek outside assistance, as discussed in interview data.

The lowest academic perfomance LD subjects exhibit more

## Table 33

## All Highest Academic Performance LD Compared to All Lowest Academic Performance LD on Hours/Week Listed in the Time Log

| Variable | Highest Academic Performance LD (N=21) | | Lowest Academic Performance LD (N=20) | | F Ratio | Sig. Level of F |
|---|---|---|---|---|---|---|
| | mean | std | mean | std | | |
| Time Log Sleep | 63.96 | 7.65 | 58.36 | 8.44 | 2.264 | .145 |
| Time Log Study | 29.81 | 14.14 | 33.45 | 17.57 | 3.55 | .557 |
| Time Log Classes | 12.44 | 5.11 | 13.00 | 3.44 | .101 | .753 |
| Time Log Leisure | 39.12 | 20.57 | 33.18 | 10.34 | .776 | .387 |
| Time Log Study Sessions | 9.94 | 3.53 | 11.27 | 4.62 | .724 | .403 |
| Time Log Length Study Sessions | 3.06 | 1.18 | 3.00 | 1.18 | .018 | .894 |

Note: Number of subjects turning in the time log were:

| | Highest Aca. Perf. LD (N=19) | Lowest Aca. Perf. LD (N=18) |
|---|---|---|
| Time log | 16 | 11 |

## Table 31

All Highest Academic Performance LD Compared to All Lowest Academic Performance on Ratings of the Exam and Paper

(Rating Scale 1 to 5; 1 = excellent performance, 5 = poor performance)

| Variable | Highest Academic Performance LD (N=21) | | Lowest Academic Performance LD (N=21) | | F Ratio | Sig. Level of F |
|---|---|---|---|---|---|---|
| | mean | std | mean | std | | |
| Exams Neat | 3.27 | 1.22 | 2.91 | 1.04 | .612 | .422 |
| Exams Gramm. | 3.13 | .74 | 3.27 | 1.00 | .165 | .688 |
| Exams Ideas | 3.46 | 1.06 | 3.09 | 0.94 | .873 | .360 |
| Exams Spelling | 3.13 | 1.19 | 3.18 | 1.25 | .010 | .921 |
| Paper Organization | 3.00 | 1.03 | 3.41 | .67 | 1.480 | .235 |
| Paper Neat | 2.00 | .52 | 2.08 | .64 | .128 | .723 |
| Paper Grammatical | 2.87 | .81 | 3.61 | .87 | 5.639 | .025** |
| Paper Ideas | 2.62 | .95 | 3.00 | 1.00 | 1.058 | .313 |
| Paper Spelling | 2.13 | 1.26 | 2.93 | .95 | 3.557 | .070* |

* $p < .10$

** $p < .05$

Note: Number of subjects turning in exams and papers were:

| | Highest Aca. Perf. LD (N=19) | Lowest Aca. Perf. LD (N=18) |
|---|---|---|
| Exam | 15 | 11 |
| Paper | 16 | 13 |

difficulties with spelling and grammar than highest academic performance LD subjects on papers. Highest and lowest academic performance LD subjects do have approximately equal ratings on grammar on the in-class essay exams. Therefore skill in grammar doesn't seem different for the two subgroups. However, the grammar rating improves for the highest academic performance subjects on papers, but gets worse for the lowest academic performance subjects. In the area of spelling, the two subgroups also have approximately equal ratings on exams. The highest academic performance LD subjects' spelling rating improves a full point on the papers; the lowest academic performance subjects' spelling rating only improves slightly. Therefore, the highest academic performance LD subjects' ratings improve in the areas of grammar and spelling for the paper situation, whereas the lowest academic performance LD subjects' ratings in these areas show no or only slight improvement.

### Hypothesis 4a.

College students with learning disabilities and indicators of learning disabilities developed different coping strategies in past learning than college students without learning disabilities.

This hypothesis was tested using interview data in the areas of methods of learning in the elementary school and high school years, methods of expression in the elementary school years and kinds of help received with academic work in the elementary and high school years. Learning disabled and control subjects were compared on the different variables.

## Comparison of LD and Control Subjects

### Methods of Learning

Subjects were asked if methods of learning were easy in the elementary and high school years. The summary of results to questions in the areas of past coping strategies appears in Table 35.

Therefore, there were no statistically significant differences in methods of learning reported in the elementary and high school years when control and LD subjects were compared.

### Methods of Expression

Subjects were questioned if it was easy for them to present material orally, in writing and in pictures in the elementary years. Their answers appear in Table 36.

## Table 35

### Comparison of LD and Control Subjects in Methods of Learning in Past Schooling

| Variable | LD (N=56) | Control (N=24) | $X^2$ | Sig. Level of $X^2$ |
|---|---|---|---|---|
| Elem., Small Group Learning, Easy | | | | |
| Yes | 48 | 22 | <1 | n.s. |
| No | 5 | 1 | | |
| Don't Know | 3 | 1 | | |
| Elem., Shown Material, Easy | | | | |
| Yes | 49 | 23 | 1.30 | n.s. |
| No | 7 | 1 | | |
| Don't Know | 0 | 0 | | |
| Elem., Told About Material, Easy | | | | |
| Yes | 45 | 21 | <1 | n.s. |
| No | 9 | 3 | | |
| Don't Know | 2 | 0 | | |
| H.S. Shown Material, Easy | | | | |
| Yes | 48 | 22 | <1 | n.s. |
| No | 5 | 1 | | |
| Don't Know | 3 | 1 | | |
| H.S., Told About Material, Easy | | | | |
| Yes | 50 | 23 | <1 | n.s. |
| No | 4 | 1 | | |
| Don't Know | 2 | 0 | | |

## Table 36

## Comparison of LD and Control Subjects on Methods of Expression in Past Learning

| | LD (N=56) | Control (N=24) | $X^2$ | Sig. Level of $X^2$ |
|---|---|---|---|---|
| Elem., Oral Expression Easy | | | | |
| Yes | 44 | 19 | <1 | n.s. |
| No | 12 | 5 | | |
| Don't Know | 0 | 0 | | |
| Elem., Written Expression Easy | | | | |
| Yes | 33 | 24 | 13.88 | <.01 |
| No | 23 | 0 | | |
| Don't Know | 0 | 0 | | |
| Elem., Pictoral Expression Easy | | | | |
| Yes | 37 | 21 | 3.50 | <.10 |
| No | 18 | 3 | | |
| Don't Know | 1 | 0 | | |

Therefore, in the elementary years, there were no statistically significant differences between LD and control subjects in the reported ease of oral expression. However, more LD students than control subjects reported encountering difficulty with writing and there is a trend of more LD students encountering problems with drawing pictures in the elementary school years. The differences between the LD and control groups in reports of writing were significant at the .01 level. Therefore, early in their schooling, more LD subjects reported difficulty with written expression than controls.

## Help With Past Learning

Coping strategies in past learning for both learning disabled and control subjects are viewed as a function of the amount and kinds of help available to students in the past. As discussed in the results section, Hypotheses 2a and 2b, LD students did receive significantly more help overall with school work during both the elementary and high school years than control subjects. A summary of the kinds of help subjects received in elementary and high school years appears in Tables 37 and 38.

The tables indicate that more LD students than controls reported help from school personnel during the school day, help from private tutors, and family help in the elementary years. In high school, more LD students reported help from

Table 37

Help Received in Elementary Years, All Subjects

| Type of Help | LD Subjects (N=56) | Control Subjects (N=24) | $X^2$ | Sig. Level of $X^2$ |
|---|---|---|---|---|
| During school day, by school personnel | | | | |
| Yes | 24 | 3 | 6.93 | <.01 |
| No | 32 | 21 | | |
| After school, by school personnel | | | | |
| Yes | 6 | 1 | <1 | n.s. |
| No | 50 | 23 | | |
| Private tutors | | | | |
| Yes | 12 | 0 | 4.48 | <.05 |
| No | 44 | 24 | | |
| Family Help | | | | |
| Yes | 26 | 5 | 4.60 | <.05 |
| No | 30 | 19 | | |
| Help by Friends | | | | |
| Yes | 3 | 1 | <1 | n.s. |
| No | 53 | 22 | | |

*Yates correction used.

Table 38

Help Received in High School Years, All Subjects

| Type of Help | LD Subjects (N=56) | Control Subjects (N=24) | $X^2$ | Sig. Level of X2 |
|---|---|---|---|---|
| During school day, by school personnel | | | | |
| Yes | 19 | 2 | 5.68 | <.05 |
| No | 37 | 22 | | |
| After school, by school personnel | | | | |
| Yes | 11 | 4 | <1 | n.s. |
| No | 45 | 20 | | |
| Private tutors | | | | |
| Yes | 14 | 4 | <1 | n.s. |
| No | 42 | 20 | | |
| Family Help | | | | |
| Yes | 12 | 4 | <1 | n.s |
| No | 44 | 20 | | |
| Help by Friends | | | | |
| Yes | 4 | 1 | <1 | n.s. |
| No | 52 | 23 | | |

school personnel during the school day than controls. This was the only area of help in high school which was different when comparing LD and control subjects. A description of help received by subjects comes from the interview data. Quotes from the interviews are given for the various kinds of help in past learning.

### Help from School Personnel

Only LD subjects elaborate in this area.

> "I had lots of tutors. In junior high reading specialists helped me and I had special workbooks."

> "I took a special reading course in high school."

> "In elementary school, I had reading tutors 2-3 times a week. In high school, the reading tutor helped me with papers."

### Private Help - Tutors

LD subjects discuss this type of help.

> "My reading improved with tutors."

> "I had a private reading tutor in third grade."

> "I failed geometry, so I got a private tutor."

> "A private tutor helped me a lot."

> "The Landmark School (a school for learning disabled students) summer sessions really helped me a lot."

> "My mother's friend helped me in reading."

Family Help

Both LD and control subjects discuss how family members assisted with past learning. The LD subjects report:

> "My sisters taught me things early, before I was ready for school - this helped me get a good start."
>
> "My father helped me learn how to study."
>
> "My father is a professional writer. He made me do spelling tests to improve my spelling."
>
> "My father helped me with spelling and edited my high school papers."
>
> "My mother was a teacher. She helped me a lot - all the way through school."
>
> "Mom was a special ed. teacher. She was a big help."
>
> "Mom helped with reading."
>
> "My mother is an educational psychologist. She had me diagnosed. My studying improved when I was diagnosed."
>
> "I got the most help from my mom through all the years."
>
> "My mother sat for hours with me." "I gave her (mom) all my papers before I handed them in."

Control subjects also pointed to family help.

> "My father taught me how to organize papers and write more elegantly."
>
> "My father is a teacher. He stressed reading and gave me a lot of help with homework."
>
> "My dad helped me with math."
>
> "Mom helps with spelling."

> "My mother helped me with English. She checked my work after I completed it."

### Friends

Friends were mentioned more often in discussing the college years than in reporting upon the elementary and high school years. A few LD students did mention borrowing class notes from friends in high school and studying with friends.

### Hypothesis 4b.

College students with learning disabilities and indicators of learning disabilities who have good academic performance in college developed different coping strategies in past learning than college students with learning disabilities and indicators of learning disabilities who have poor academic performance in college.

This hypothesis was tested using interview data about past coping strategies including methods of expression, and kinds of help received. Comparisons were made between the good and poor academic performance LD groups. Then, the highest and lowest academic performance LD subjects were compared.

## Comparison of Good and Poor Academic Performance LD Subjects

### Methods of Learning

Good and poor academic performance LD subjects were compared in methods of learning in the elementary and high school years. The results are presented in Table 39.

Therefore, no statistically significant differences appear in methods of past learning when good and poor academic performance LD subjects are compared.

## Methods of Expression

Good and poor academic performance LD subjects were compared on the variables concerning methods of expression which were easy for them in the elementary and high school years. The results appear in Table 40.

There were no significant differences between good and poor academic performance LD subjects on reported methods of expression which were easy in past schooling.

## Help with Past Learning

Help in past learning was expected to be different for good academic performance LD subjects as compared to poor academic LD subjects. A summary of the kinds of help received by LD subjects in the elementary and high school years appears in Tables 41 and 42.

There were no differences among learning disabled subjects with good academic performance and learning disabled subjects with poor academic performance in the various types of help reported in the elementary and secondary years.

## Table 39

## Comparison of Good and Poor Academic Performance LD

| | Good Aca. Perf. LD (N=28) | Poor Aca. Perf. LD (N=28) | $X^2$ | Sig. Level of $X^2$ |
|---|---|---|---|---|
| Elem., Small Group Learning, Easy | | | | |
| Yes | 22 | 26 | <1 | n.s. |
| No | 3 | 2 | | |
| Don't know | 3 | 0 | | |
| Elem., Shown Material, Easy | | | | |
| Yes | 24 | 25 | <1 | n.s |
| No | 4 | 3 | | |
| Don't know | 0 | 0 | | |
| Elem., Told About Material, Easy | | | | |
| Yes | 22 | 23 | <1 | n.s. |
| No | 5 | 4 | | |
| Don't know | 1 | 1 | | |
| H.S. Shown Material, Easy | | | | |
| Yes | 24 | 24 | <1 | n.s |
| No | 2 | 3 | | |
| Don't know | 2 | 1 | | |
| H.S., Told About Material, Easy | | | | |
| Yes | 26 | 24 | <1 | n.s. |
| No | 1 | 3 | | |
| Don't know | 1 | 1 | | |

Table 40

Comparison of LD and Control Subjects on Methods of Expression in Past Learning

| | Good Aca. Perf. LD (N=28) | Poor Aca. Perf. LD (N=28) | $X^2$ | Sig. Level of $X^2$ |
|---|---|---|---|---|
| Elem., Oral Expression Easy | | | | |
| Yes | 22 | 22 | <1 | n.s. |
| No | 6 | 6 | | |
| Don't know | 0 | 0 | | |
| Elem., Written Expression Easy | | | | |
| Yes | 18 | 15 | <1 | n.s. |
| No | 10 | 13 | | |
| Don't know | 0 | 0 | | |
| Elem., Pictoral Expression Easy | | | | |
| Yes | 19 | 18 | <1 | n.s. |
| No | 9 | 9 | | |
| Don't know | 0 | 1 | | |

## Table 41

### Help Received in Elementary Years, LD Subjects

| Type of Help | Good Aca. Perf. LD (N=28) | Poor Aca. Perf. LD (N=28) | $X^2$ | Sig. Level of $X^2$ |
|---|---|---|---|---|
| During school day, by school personnel | | | <1 | n.s. |
| Yes | 11 | 13 | | |
| No | 17 | 15 | | |
| After school, by school personnel | | | <1 | n.s. |
| Yes | 1 | 4 | | |
| No | 27 | 24 | | |
| Private tutors | | | 1.70 | n.s. |
| Yes | 8 | 4 | | |
| No | 20 | 24 | | |
| Family help | | | <1 | n.s. |
| Yes | 14 | 12 | | |
| No | 14 | 16 | | |
| Help by friends | | | <1 | n.s. |
| Yes | 2 | 1 | | |
| No | 26 | 27 | | |

## Table 42

## Help Received in High School Years, LD Subjects

| Type of Help | Good Aca. Perf. LD (N=28) | Poor Aca. Perf. LD (N=28) | $X^2$ | Sig. Level of $X^2$ |
|---|---|---|---|---|
| During school day, by school personnel | | | | |
| Yes | 9 | 10 | <1 | n.s. |
| No | 19 | 18 | | |
| After school, by school personnel | | | | |
| Yes | 5 | 6 | <1 | n.s. |
| No | 23 | 22 | | |
| Private tutors | | | | |
| Yes | 8 | 6 | <1 | n.s. |
| No | 20 | 22 | | |
| Family help | | | | |
| Yes | 7 | 5 | <1 | n.s. |
| No | 21 | 23 | | |
| Help by friends | | | | |
| Yes | 1 | 3 | <1 | n.s. |
| No | 27 | 25 | | |

## Comparison of Highest and Lowest Academic Performance LD Subjects

The data was analyzed comparing only the highest and lowest academic performance LD subjects on methods of learning, methods of expression, and kind of help received in past learning.

### Methods of Learning

The highest and lowest academic performance subjects were compared in methods of learning in elementary and high school. The results are presented in Table 43.

There were no significant differences in methods of learning which were easy in the elementary and high school years when the highest and lowest academic performance LD subjects were compared.

### Methods of Expression

The comparison of highest and lowest academic performance LD subjects on method of expression in past learning appear in Table 44.

There were no significant differences between highest and lowest academic performance subjects on methods of expression.

### Help in Past Learning

Help in past learning was expected to be different for highest and lowest academic performance LD subjects. A sum-

## Table 43

## Comparison of Highest and Lowest Academic Performance LD Subjects on Methods of Learning in Past Schooling

| Type of Help | Highest Aca. Perf. LD (N=19) | Lowest Aca. Perf. LD (N=18) | $X^2$ | Sig. Level of $X^2$ |
|---|---|---|---|---|
| Elem., Small Group Learning, Easy | | | | |
| Yes | 15 | 16 | <1 | n.s. |
| No | 3 | 2 | | |
| Don't know | 1 | 0 | | |
| Elem., Shown Material, Easy | | | | |
| Yes | 16 | 17 | <1 | n.s. |
| No | 3 | 1 | | |
| Don't know | 0 | 1 | | |
| Elem., Told About Material, Easy | | | | |
| Yes | 16 | 15 | <1 | n.s. |
| No | 2 | 2 | | |
| Don't know | 1 | 1 | | |
| H.S. Shown Material, Easy | | | | |
| Yes | 17 | 17 | <1 | n.s. |
| No | 1 | 0 | | |
| Don't know | 1 | 1 | | |
| H.S., Told About Material, Easy | | | | |
| Yes | 18 | 15 | <1 | n.s. |
| No | 0 | 2 | | |
| Don't know | 1 | 1 | | |

## Table 44

### Comparison of Highest and Lowest Academic Performance LD Subjects on Methods of Expression in Past Learning

| | Highest Academic Performance LD (N=19) | Lowest Academic Performance LD (N=18) | $X^2$ | Sig. Level of $X^2$ |
|---|---|---|---|---|
| Elem., Oral Expression, Easy | | | | |
| Yes | 15 | 14 | <1 | n.s. |
| No | 4 | 4 | | |
| Elem., Written Expression, Easy | | | | |
| Yes | 11 | 7 | 2.10 | n.s. |
| No | 8 | 11 | | |
| Elem., Pictoral Expression, Easy | | | | |
| Yes | 15 | 14 | <1 | n.s. |
| No | 4 | 4 | | |

mary of the kinds of help reported by subjects in these subgroups appears in Tables 45 and 46.

There were no significant differences in comparisons of highest and lowest academic performance subjects on reported help in past learning. One trend is more LD students in the lowest academic performance group received help in school in the years than LD students in the lowest academic performance group.

Therefore, there were no statistically significant differences between highest and lowest academic performance LD subjects in reported coping strtegies in past learning. Qualitative descriptions of coping strategies appear in the section following Hypothesis 5b.

## Table 45

### Help Received in Elementary Years, Highest and Lowest Academic Performance LD Subjects

| Type of Help | Highest Academic Performance LD (N=19) | Lowest Academic Performance LD (N=18) | $X^2$ | Sig. Level of $X^2$ |
|---|---|---|---|---|
| During school day, by school personnel | | | | |
| Yes | 5 | 10 | 3.28 | <.10 |
| No | 14 | 8 | | |
| After school, by school personnel | | | | |
| Yes | 1 | 2 | <1 | n.s. |
| No | 18 | 16 | | |
| Private tutors | | | | |
| Yes | 7 | 3 | *1.00 | n.s. |
| No | 12 | 15 | | |
| Family help | | | | |
| Yes | 10 | 10 | <1 | n.s. |
| No | 9 | 8 | | |
| Help by friends | | | | |
| Yes | 1 | 0 | <1 | n.s. |
| No | 18 | 18 | | |

*Yates correction used.

## Table 46

## Help Recieved in High School Years, Highest and Lowest Academic Performance LD Subjects

| Type of Help | Highest Academic Performance LD (N=19) | Lowest Academic Performance LD (N=18) | $X^2$ | Sig. Level of $X^2$ |
|---|---|---|---|---|
| During school day, by school personnel | | | | |
| Yes | 3 | 5 | <1 | n.s. |
| No | 16 | 13 | | |
| After school, by school personnel | | | | |
| Yes | 4 | 4 | <1 | n.s. |
| No | 15 | 14 | | |
| Private tutors | | | | |
| Yes | 6 | 5 | <1 | n.s. |
| No | 13 | 13 | | |
| Family help | | | | |
| Yes | 5 | 3 | <1 | n.s. |
| No | 14 | 15 | | |
| Help by friends | | | | |
| Yes | 1 | 1 | <1 | n.s. |
| No | 18 | 17 | | |

Hypothesis 5a.

College students with learning disabilities and indicators of learning disabilities have different coping strategies to deal with college work than college students without learning disabilities and indicators of learning disabilities.

## Comparison of LD and Control Subjects

Coping strategies used to deal with current academic work in college were expected to be different for LD and control subjects. One area of coping strategies in college was explored by questions about assistance received in dealing with academic work. A summary of the kinds of help subjects reported receiving in college appears in Table 47.

More learning disabled students reported help from University resources than controls. The University resource mentioned most often was the Writing Center, a center open to the entire Clark University undergraduate community for assistance in writing papers. Qualitative information about coping strategies appears in a later section. Therefore Hypothesis 5b is supported in only one area of help, use of University Resources.

Hypothesis 5b.

College students with learning disabilities and indicators of learning disabilities who have good academic performance in college have different coping strategies to deal with

Table 47

Help Received in College, All Subjects

| Type of Help | LD (N=56) | Control (N=24) | $X^2$ | Sig. Level of $X^2$ |
|---|---|---|---|---|
| Friends | | | | |
| Yes | 17 | 9 | <1 | n.s. |
| No | 39 | 15 | | |
| Faculty | | | | |
| Yes | 21 | 8 | <1 | n.s. |
| No | 35 | 16 | | |
| University Resources | | | | |
| Yes | 19 | 3 | 3.86 | <.05 |
| No | 37 | 21 | | |
| Private Tutor | | | | |
| Yes | 2 | 0 | <1 | n.s. |
| No | 54 | 24 | | |
| Family | | | | |
| Yes | 4 | 1 | <1 | n.s. |
| No | 52 | 23 | | |

college work than college students with learning poor academic performance in college.

## Comparison of Subgroups of LD Population

Use of help in meeting the academic demand of college was expected to be different for LD students with good academic performance when compared to LD students with poor academic performance. The kinds of help utilized by college students with learning disabilities is summarized in Table 48.

No striking differences appear in kinds of help in college utilized by good academic performance LD subjects when compared to poor academic performance LD subjects.

The data was reexamined for highest and lowest academic performance LD subjects on help received in college. The results appear in Table 49.

The comparison of highest and lowest academic performance LD subjects on kinds of help received in college yields no differences. Further description of specific college coping strategies which are not analyzed statistically appear in the following section, Qualitative Data Pertaining to Coping Strategies.

## QUALITATIVE DATA PERTAINING TO COPING STRATEGIES

In addition to addressing the hypotheses about coping strategies, the interviews yielded much qualitative information about coping strategies in both past learning and during

## Table 48

### Comparison of Good and Poor Academic Performance LD Subjects on Help Received in College

| Type of Help | Good Academic LD (N=18) | Poor Academic LD (N=19) | $X^2$ | Sig. Level of $X^2$ |
|---|---|---|---|---|
| Friends | | | | |
| Yes | 8 | 9 | <1 | n.s. |
| No | 20 | 19 | | |
| Faculty | | | | |
| Yes | 10 | 10 | <1 | n.s. |
| No | 18 | 18 | | |
| University Resources | | | | |
| Yes | 7 | 11 | <1 | n.s. |
| No | 21 | 17 | | |
| Private Tutor | | | | |
| Yes | 1 | 1 | <1 | n.s. |
| No | 27 | 27 | | |
| Family | | | | |
| Yes | 3 | 1 | <1 | n.s. |
| No | 25 | 27 | | |

## Table 49

## Comparison of Highest and Lowest Academic Performance LD Subjects on Help Received in College

| Type of Help | Highest Aca. Perf. LD (N=19) | Lowest Aca. Perf. LD (N=18) | $X^2$ | Sig. Level of $X^2$ |
|---|---|---|---|---|
| Friends | | | | |
| Yes | 5 | 5 | <1 | n.s. |
| No | 14 | 13 | | |
| Faculty | | | | |
| Yes | 7 | 5 | <1 | n.s. |
| No | 12 | 13 | | |
| University Resources | | | | |
| Yes | 5 | 7 | <1 | n.s. |
| No | 14 | 11 | | |
| Private Tutor | | | | |
| Yes | 1 | 0 | <1 | n.s. |
| No | 18 | 18 | | |
| Family | | | | |
| Yes | 2 | 1 | <1 | n.s. |
| No | 17 | 17 | | |

the college years. Although not proving or disproving the hypotheses about coping strategies, this qualitative data provides much information about coping strategies used by LD students. The researcher took the interview data and categorized it into themes concerning problems in learning and coping strategies developed to deal with learning problems. The researcher analyzed the qualitative data by themes, or strands, without categorizing the data by the period of learning or subject matter. Some of the quotes do indicate a particular time in learning, high school or college, or a particular subject matter. The themes have been grouped together by related topic for this discussion.

## Coping Strategies of LD Compared to Control Subjects

### Coping Strategies Dealing With Reading

#### Reading Method (discussed by 2 LD subjects, 0 control subjects)

Two subjects, both in the good academic performance LD group, reported learning to read by ITA, the Initial Teaching Alphabet approach. No other subjects, poor academic performance LD or control, mentioned this method. Although the findings would not be close statistically significant, they are intriguing. Practitioners in the LD field suggest removing ambiguity and providing structure for LD students. Problems in decision-making were discussed by the present subjects as a persistent problem area. Use of a system like ITA which reduces the need for making choices in beginning reading (Is "a" long or short?, Does "s" have a s or z sound?) may be more successful than the other systems. Neither student mentioned problems in making the transition to using the regular alphabet at later times.

No subjects specifically mentioned traditional special education techniques, such as the Orton-Gillingham or Fernald approaches. However, in receiving help in school or privately, special methods may have been employed without subjects being aware of the names of the methods.

Reading Comprehension (discussed by 13 LD students, 0 control subjects)

In discussing reading during the elementary and high school years, five LD students mentioned good comprehension as a strength and aid in learning. Eight students felt problems in comprehension hindered them. For the students who felt they had good comprehension, this strength could have helped overcome weaknesses in decoding individual words, skipping words and parts of words in reading, and in memorizing isolated facts. No control subjects discussed the comprehension area.

Learning disabled students' comments about comprehension include:

> "Comprehension is a problem. I could read foreign languages, but not understand what they meant."

> "My reading comprehension is good. If I can't sound out words, I skip them... I still get the message."

Conceptualization (discussed by 21 LD subjects, 4 control subjects)

In a related vein, 10 LD students mentioned conceptual and abstract abilities as stengths, and 11 LD students cited difficulties in this area. No control subjects discussed conceptualizing as a strength, and four control subjects reported problems in conceptualization.

The LD subjects who reported conceptualizaton as strength said:

> "I'm good at abstraction."
>
> "I could remember the concepts, but not the facts."
>
> "I could get the overall idea, but not individual facts."
>
> "I had no trouble making the application in history, government, geography."
>
> "My ideas on papers are fine. I always get marked down in grammar and spelling."
>
> "My ideas are no problem in writing, I get stuck with the mechanics."
>
> "Psychology was easy, mostly conceptual and not written."

The LD subjects who felt conceptualizing was a problem stated:

> "In junior and senior high school, I got bits and pieces of things. I never integrated or got things in depth."

> "I had trouble grasping the concepts in H.S. geometry."

> "The hardest thing for me was applying the concepts I know - I had to work at it."

Reading Time (discussed by 10 LD subjects, 2 control subjects)

The amount of time needed to do reading was mentioned by LD students. Needing more time in areas other than reading is listed in separate section of the discussion.

> "I outline everything I read - takes much longer."

> "My reading is slow. It takes me more time."

> "I read more slowly."

> "I read slowly, so therefore require more time."

> "Reading slower was a big problem in high school."

> "I need more time for reading, I go over material several times before I understand it.

> "I read so slowly that I lose interest."

Two control subjects also mentioned slow reading:

> "I read slowly' I needed some help in twelfth grade."

> I wish I could read faster. In high school this was a problem. It lowered all my subjects."

Time (discussed by 22 LD subjects and 3 control subjects)

Use of time and needing more time to complete required work was mentioned by 22 students in the LD group. Only three control subjects discussed time pressures or spending more time on school work as a coping strategy. Extra time was both a stressor and a coping strategy. Most of the LD students realized they needed to spend much more time for learning tasks than others.

> "I plan my time thoroughly."
>
> "Time was a handicap for me in h.s. math."
>
> "I always read very slowly - needed much more time."
>
> "I need time to organize my thoughts; I'm not good at speaking off the top of my head."
>
> "I spend more time - this helps in most subjects."

A control subject who discussed use of time reported:

> "I need extra time to work out problems on tests."

Some learning disabled students require added time not only to study and do reading, but in getting their thoughts organized and in expressive language, both written and spoken. Word finding problems for LD subjects were often noted during appointments and testing sessions. These problems are discussed in more detail in a later section. In summary, the topic of time was one of the most frequently mentioned ones in the area of coping strategies.

### Memorization, Grammar, Details

These three themes seemed to overlap and tap similar problem areas. These themes seemed to represent problems with isolated facts and figures, especially non-meaningful detail.

#### Memorization (discussed by 25 LD subjects, 0 control subjects)

Five LD students cited strengths in memory as a coping strategy, while 20 LD students cite difficulties with learning requiring memorization. No control subjects discussed the theme of memorization. Comments made by LD students about memorization are:

> "I write a few phrases for memory cues in lectures - I mostly listen."
>
> "In college, I memorize my biology notebook every day."
>
> "If I can't remember. I figure things out."
>
> "I can memorize better if I use a pencil and paper [write things down]."
>
> "Computers and calculus are difficult - I must memorize lots of little facts rather than major concepts."
>
> "I'm not motivated for direct memorization of material in Psych."
>
> "Psychology and Accounting had too many rules - too much memorization."
>
> "I have a poor memory, so test taking is 'hard.'"
>
> "I never learned my math facts."
> "I sometimes can't remember (formulas, facts) so I figure things out."

> "I couldn't remember tables and numbers."
>
> I have a bad memory for how words are spelled."
>
> "I failed French two years in a row; I couldn't memorize all the rules."

A few control subjects make similar points about memorization:

> "I needed to spend a long time memorizing words - I leave out letters."
>
> "I write outlines to help me memorize."
>
> "In high school foreign languages class, memorization was an irritation."

Grammar (discussed by 16 LD subjects, 2 control subjects)

Many LD subjects cited difficulties with grammar in past learning. LD subjects did not perform significantly different on the grammar section of the Test of Adolescent Language. However, the lowered scores on Expressive Language Quotient of the TOAL in part reflected difficulties with plurals, word endings, and syntactical components of language.

Learning disabled subjects cite these problems with grammar in past learning:

> "I have no understanding of grammar."
>
> "I leave out words constantly in writing and speaking."
>
> "I can't write the correct tense."
>
> "I don't know the parts of speech."
> "I can't tell if something is a whole sentence when I write."

> "English grammar is so hard."
>
> "Grammar and spelling is a problem in writing." (Note - student used incorrect grammar in speaking.)

Details (discussed by 20 LD subjects, 1 control subject)

Difficulties with details surfaced for 20 LD subjects, but were mentioned by only one control subject. The LD subjects stated:

> "Heavily factual subjects, like economics, are hard to learn."
>
> "I couldn't remember the greater and less than (> and <) signs in math."
>
> "I couldn't deal with math facts and rules."
>
> "I can't hang onto facts."
>
> "Mechanics are a problem in writing."
>
> "I can't remember picky facts."
>
> "I have to look up every word in spelling."
>
> "Math was o.k. for me as soon as I didn't have to write specific numbers in order. I was much better at solving problems."
>
> "Forget foreign languages. The details all got lost."

Some students mentioned how they coped with difficulties in memory, grammar, and with details.

> "I look everything up in the dictionary."
>
> "If I couldn't remember something, I'd try to figure it out."
>
> "I'm a creative speller."

> "I was much better in math when we stopped doing the flash cards."

Students with learning disabilities seem to use their conceptualization and problem solving skills to overcome difficulties in memorization and dealing with non-meaningful details. Putting details into a meaningful framework seemed to help some students. Others survived as best as they could until they did not have to rely upon strict memory. Several subjects mentioned that as subjects such as math progressed from reliance upon rote learning to application, they were able to perform better.

Drawing, Copying, Handwriting (discussed by 8 LD subjects, 0 control subjects)

Eight LD subjects discussed problems in drawing, copying and handwriting, while no control subjects discussed this area.

> "I had trouble in high school trig. and geometry. I couldn't draw. I also had drawing trouble in bio."
>
> "I have a severe problem copying diagrams."
>
> "I have poor writing. I always print, never use cursive."
>
> "My handwriting always was sloppy."

To cope with poor handwriting in past learning, most students who discussed this area said that they always print. Poor handwriting and/or drawing, as a manifestation of visual-motor integration problems, seems to partially explain why LD

Students need more time to do work. Even college observations showed laborious writing. Some LD students seem to need more time to receive and process information, and some seem to require additional time to cope with the demands of visual-motor tasks.

### Extemporaneous Speaking and Word-Finding Problems (discussed by 11 LD subjects, 1 control subject)

Three LD students discussed extemporaneous speaking as a strength, while 8 view this area negatively. Only one control subject discussed problems in extemporaneous speaking. The LD subjects who saw their oral abilities as a strength used these strengths in speaking to overcome other deficits:

> "Dyslexics get good at extemporaneous speaking - you have to learn how to make excuses on the spot."
>
> "I'm good at creative BS. I use this to get by. I get bogged down if facts are needed."
>
> "I compensate for my poor writing with my oral abilities."

However, not all LD students were able to use oral speech to compensate for other difficulties. The LD students who experienced problems in extemporaneous speaking said:

> "I can't express myself elaborately. I have to use basic terms."
>
> "I have a phobia about speaking in class."
> "I have been shy and inhibited from elementary school through college. Things don't come out well because I'm too nervous."

Some LD students specifically attribute their speaking difficulties to word-finding problems. No control subjects mentioned word-finding difficulties.

> "I think faster than I can speak or write."
>
> "I have high, what do you call it, ... comprehension. But I have trouble phrasing what I want to say."
>
> "Words are difficult to find. I want to use them right and without being vague, but I can't find it." (This thought uses vague terms!)
>
> "In elementary school I would freeze when I read out loud, but I knew the words inside."
>
> "I know what I want to say, but the words don't come."
>
> "I have trouble with oral and written work. If I can't find the proper word, I use a whole other word. Sometimes I have to change a whole sentence around."

The issue of anxiety about oral speaking tasks arose in many interviews. However, the anxiety about oral expression seems to grow from the learning disability. On the Test of Adolescent Language, LD students were significantly different from controls on the Expressive Language Quotient. The LD students interviewed seemed painfully aware of their inability, in both past and present learning, to come up with the correct words to express their thoughts. A few described specific incidents of embarrassment when an incorrect word or no word at all surfaced. One student spoke of appearing "flaky" because she often drops sentences in midstream when she can not retrieve a correct word. She starts over and constructs an entirely new sentence to get her point across. This compensating takes added time and effort for the LD subjects.

Organization (discussed by 15 LD subjects, 0 control subjects)

Fifteen LD subjects and no control subjects discussed organizational abilities during the interview. Five LD subjects reported strength in organization as a coping strategy, and 10 LD subjects discussed problems in organization.

Those students reporting organizational abilities as strengths said:

> "I break everything down into parts."
>
> "I used teachers sometimes to help organize papers."
>
> "I break things down."

Those students having problems with organization report:

> "I miss things I can't organize, so I have isolated facts."
>
> "I keep repeating ideas in papers I write because my ideas aren't organized."
>
> "I have troube organizing ideas and the materials I gather."
> "I can't organize my notes; can't pick out the important ideas."

Dropped Subjects/Didn't Take Subjects (discussed by 12 LD subjects, 4 control subjects)

Course selection in college is more flexible for most students than in high school. This flexibility is utilized as a coping strategy by some LD students. The availablity of a no-record option where nothing is recorded on transcripts if courses are dropped, also assists some LD students.

> "I avoid science and math."
>
> "I have withdrawn from some courses."
>
> "I avoid subjects with too much reading."
>
> "I ignored calculus. I gave up ...it was too hard."
>
> "I can't do math and science, so I don't take them."

Self-Discipline/Effort (discussed by 5 LD, 0 control subjects)

Some LD students describe the extra effort they expend to meet academic requirements. These students realize that they can't leave assignments until the end, that they need extra time and effort to succeed.

> "In college, I use self-discipline to do studying. I put in the time to read and memorize material."
>
> "I make sure I keep up with the day-to-day work and reading."
>
> "I outline everything. I go over every sentence. I write to see if there's a subject and predicate."

Miscellaneous, Unique Coping Strategies

A few coping strategies were mentioned by small numbers or just one student. However, they could be utilized by other students. These strategies are presented below.

Anger (discussed by 1 LD, 0 control subjects)

"I was angry at my high school teachers who said I wouldn't make it in college." This anger was a source of motivation for the student, who was determined to succeed in college.

Clustering of Subjects (discussed by 1 LD, 0 control subjects)

"I take many subjects in one area, to cut down on reading." Only one student mentioned this as a coping strategy. However, this strategy seems to have merit for students with reading difficulties or time problems. Taking more than one course in an area or field at the same time could lighten the reading load. Also, although the student himself did not mention this, the clustering strategy could also reduce the number of basic concepts and ideas handled by a student at a particular time, further simplifying organization concerns.

Demonstration (discussed by 2 LD subjects, 0 control subjects)

Two LD students specifically mentioned that it was easiest for them to learn if demonstration is used as a teaching technique. Most college courses rely more on verbal presentation methods. However, these two students would benefit from more learning by demonstration.

Encyclopedia/Newspaper (discussed by 1 LD subject, 0 control subjects)

One LD student said that he used the outlines from encyclopedias for research papers. He felt this technique helped him organize class assignments. The same student said that he uses newspaper and magazine material to help him relate ideas (he was a government major). "Teachers like this, especially in class discussions," he reported. This student didn't mention the easier reading level of these two sources, encyclopedias and news materials, as being helpful. It seems logical that the easier level of these materials, and the pictorial material available in them, would enhance their usefulness for LD college students in some subject areas.

Listening (discussed by 2 LD subjects, 0 control subjects)

Two LD students report using strengths in listening as definite coping strategies.

> "In college classes I just listen. When I write notes, I get all tangled."
>
> "I don't take notes in class - just use a few cue words."

For these students, attending all classes becomes important. These students use class material to organize their approach to readings and outside work.

Humor (discussed by 3 LD subjects, 0 control subjects)

The students interviewed did not consciously mention maintaining a sense of humor as important. However, for several LD students, their comments were revealing.

"I'm a creative speller."

"For grammar, I use the 'sounds good' method."

"I'm no athlete, but I get by."

These comments indicate a playful attitude toward problems in school, whether the problems are in spelling, writing papers, or physical education class. This relaxed and almost playful attitude toward specific learning problems is quite a contrast to the anxious tone of many other interviews.

### Internships (discussed by 1 LD subject, 0 control subjects)

One LD student spoke of using internships as a way of coping. The student took an internship as a full course program during the semester in which he was interviewed. An internship can alleviate or lessen the academic demands of university courses. The researcher had expected more LD students to use internships as coping strategies. However, more than half the study participants were freshmen and sophomores, and internships usually occur in the final two college years. The option of work experiences, internships, and practicum experiences could certainly be utilized favorably by LD students.

### Class Notes (discussed by 8 LD subjects, 0 control subjects)

Several LD students discussed how their class notes helped them.

> "I need to write things in class word for word - I can't put it into my own words."
>
> "I use class notes extensively. I don't always do all the reading."
>
> "I copy over class notes after class."
>
> "I take extensive notes - I'm not always sure what will be important."

Personal Shorthand (discussed by 1 LD subject, 0 control subjects)

One LD student mentioned using a personal shorthand for notes and writing assignments, "I think faster than I write."

Proof Reading/Typing (discussed by 2 LD subjects, 0 control subjects)

Two LD students hired typists to type papers and to do proof reading. These two students, aware of problems with spelling and grammar, utilize typists as a way of coping. Two other LD students report that typing rather than handwriting papers helps the flow of ideas.

Spatial Technique (discussed by 3 LD subjects, 0 control subjects)

Two LD students reported extreme difficulty with subjects requiring spatial skills. They discussed problems interpreting graphs and in constructing models. However, one LD student reported using a spatial or visual drawing as a helpful study aid. She had worked with the researcher to develop the technique of diagramming course material into unique configurations to better organize and remember it.

Tape-Recorder (discussed by 2 LD subjects, 0 control subjects)

Tape-recorders were utilized by two LD students to help with college work.

> "I have a new technique. For writing papers, I write my ideas down, read them into a tape-recorder, and give the tape to a typist. This has been very helpful."

For this student, the typist is able to transform the verbal material into proper written form, using correct spelling and punctuation, which are not required in oral speech. He is thus able to pass over his weak areas.

The second student uses Recordings for the Blind to help get through his reading assignments.

Good Teacher (discussed by 4 LD subjects, 0 control subjects)

Four LD students felt that having a good teacher was critical to college success.

> "If a teacher is a good story teller, I'll learn."
>
> "For example, in Economics the professor is well orgnized and follows a good pace. This makes it easier to learn."
>
> "The teacher makes a great difference."
>
> "The way history and government are taught makes it easier."

For these students, a good teacher seems to be one who provides a lot of structure, and one whose class lectures illuminate readings. For the LD students who discussed various college teachers, the most problematic situation was where class material didn't relate to readings. It's almost as if some LD students need the repetition of material (class and readings) to learn, as well as the structure of a well-organized lecture to pull together reading assignments.

Writing Things Out (discussed by 5 LD subjects, 0 control subjects)

Five LD Students discussed outlining and writing out material as a study aid. This is used both for memorization of material and general learning.

## Coping Strategies of Good Compared to Poor Academic Performance LD Subjects

These coping strategies which seem different for good and poor academic LD subjects are presented in this section.

Family Help - Father (discussed by 3 Good Academic Performance LD subjects, 0 Poor Academic Performance LD subjects)

While equal mention is given to help by mother during past learning, three LD subjects in the good academic performance group discuss the help given by their fathers while no subjects in the poor academic performance LD group discuss help by fathers. While lack of large numbers makes a formal conclusion impossible, perhaps involvement by fathers or the interaction of help by both parents is one area suitable for further investigation of good ademical performance LD students.

Reading Method - ITA (discussed by 2 Good Academic Performance LD subjects, 0 Poor Academic Performance LD subjects)

The mention of the initial teaching alphabet as helpful by two subjects in the good academic performance group and none in the poor academic performance group is highlighted here.

Reading Comprehension - Good and Poor (discussed by 6 Good Academic Performance LD subjects, 7 Poor Academic Performance LD subjects)

Despite frequent mention of extra time for reading needed by LD subjects when compared to control subjects, four LD subjects in the good academic performance group felt that strengths in reading comprehension enabled them to cope with course material. Only one LD subject in the poor academic performance group cited strength in reading comprehension as a coping strategy. However, six LD students in the poor academic performance group cited problems in reading comprehension, while only two good academic performance subjects had similar concerns. Therefore, it would seem that interview data does corroborate the data from the psychoeducational assessments concerning reading comprehension; strength in reading comprehension serves as a coping strategy for LD students with good academic performance. Comprehension strengths may help some LD students compensate for difficulties with details, spelling, grammar, and syntax.

Grammar (discussed by 6 Good Academic Performance LD subjects, 10 Poor Academic Performance LD subjects)

Problems with grammar are mentioned by 6 LD subjects with good academic performance and 10 LD subjects with poor academic performance. Difficulties with grammar in both past and present learning may be a factor contributing to academic success or lack of such success for LD students.

Organization (discussed by 9 Good Academic Performance LD Subjects, 6 Poor Academic Performance LD Subjects)

College students with learning disabilities continue to report problems with organization. Five LD students with good academic performance use good organizational skills as coping strategies:

> "I outline everything."
>
> "I organize material by doing it section by section."
>
> "I make a schedule every day."

None of the LD students with poor academic performance mentioned good organization skills, but four good academic performance LD students and several poor academic performance LD students discussed disorganization and problems with decision making.

> "I can't organize my notes."
>
> "I repeat ideas over and over, can't organize the ideas."
>
> "It's hard to organize research papers."
>
> "I struggle with organization."
>
> "It's hard for me to organize my toughts, so when I speak, I don't sound coherent or logical."

Skipping Day to Day Work (discussed by 0 Good Academic Performance LD subjects, 2 Poor Academic Performance LD subjects)

No student in the good academic performance group reported skipping work as a coping strategy. Two LD students in the poor academic performance group discuss the inability to keep up with assigned academic work.

> "I can get by without the day-to-day work. I can pace myself and have more leisure time."
>
> "I sometimes read only the first sentence or two of every paragrah. I couldn't keep up if I did the whole thing."

Discipline/Effort (discussed by 5 Good Academic Performance LD subjects, 0 Poor Academic Performance LD subjects)

In contrast to the acceptance of skipping work by poor academic performance LD subjects five LD students in the good academic performance group discuss the importance of keeping up with assignments and being disciplined in their study habits.

> "I use self-discipline to study. I put in the time to read and memorize materials. I keep

> up with day-to-day work and reading."
>
> "I outline everything. I go over every sentence I write."
>
> "I must make the effort."

Articulate Verbally (discussed by 3 Good Academic Performance LD subjects, 0 Poor Academic Performance LD subjects)

Three LD students in the good academic performance group discuss how being verbally articulate helps them.

> "I compensated for writing with oral abilities."
>
> "I use creative BS to get by when I get bogged down."
>
> "I have good oral skills. This helps me."

No LD students in the poor academic performance group mentioned strong oral skills.

Listening (discussed by 2 Good Academic Performance LD subjects, 3 Poor Academic Performance LD subjects)

In a related vein, two LD students in the good academic performance group discussed the importance of good listening and their ability to benefit from class lectures and discussions. No LD students in the poor academic performance group expressed strengths in auditory skills.

Class Notes (discussed by 6 Good Academic Performance LD subjects, 2 Poor Academic Performance LD subjects)

Six LD students in the good academic performance group discuss how class notes help them. Only two LD students in the poor academic performance group discusses class notes as an aid.

Typist/Proof Reading (discussed by 2 Good Academic Performance LD subjects, 0 Poor Academic Performance LD subjects)

The two LD students who use a typist to compensate for poor spellng, grammar and syntax were in the good academic performance group. No LD students in the poor academic performance group utilized typists in this way.

Humor (discussed by 3 Good Academic Performance LD subjects, 0 Poor Academic Performance LD subjects)

An accepting and somewhat playful attitude toward learning problems was more characteristic of the good academic performance group. Comments such as "I'm a creative speller" and "I use the 'sounds good' method for grammar" indicate an acceptance of problems caused by learning disabilities without devastation. These comments were only made by students in the good academic performance LD group. No students in the poor academic performance LD group showed a sense of humor or playfulness in discussing their problems.

Friends (discussed by 4 Good Academic Performance LD subjects, 7 Poor Academic Performance LD subjects)

Although friends were cited equally often as resources by members of both good and poor academic performance LD groups, there is a different flavor to the comments by the two groups. Two LD students in the good academic performance group discuss using friends to type and proof read papers. Seven students in the poor academic performance LD group discuss utilizng friends as a resource. Several students in the poor academic performance group report studying with friends, and studying in a group. No students in the good academic performance group report studying in a group. Perhaps studying in a group becomes a necessity for students in the poor academic performance LD group due to poorer reading skills than the good academic performance LD group. Or studying with others may not be as effective as studying alone and putting in the extra time and effort necessary to master material.

## PROCESS ANALYSIS OF PSYCHOEDUCATIONAL ASSESSMENTS

The observations made by examiners about processes used by students on the psychoeducational assessments were qualitatively analyzed to provide further information about learning problems and coping strategies. First, process analysis comparing all learning disabled and control subjects is discussed. Then, trends differentiating good and poor academic performance LD subjects are presented.

### Comparison of LD and Control Subjects

#### Bender Gestalt

There were no trends in the time needed to complete the Bender drawings when the LD and control subjects were compared. The range of time needed by LD students ranged from 3 minutes, 48 seconds to 20 minutes, while the range of time used by control subjects was 3 minutes to 29 minutes, 4 seconds.

The mean Bender scores of LD and control subjects were different at the .10 level when the statistical analysis was done. However, it is striking that any subjects, LD or control, have scorable errors in the Bender. Sixteen LD subjects missed one or more of the drawings, and three control subjects missed one or more drawings. However, even for those students who have no scorable errors, qualitative information points to differences between LD and control subjects. Erasures are noted for twenty-one LD students and four control subjects. Counting of dots as a coping strategy are observed for 10 LD students and no control subjects. Eight learning disabled students turned either the stimulus card or their papers as a coping strategy; no control subjects exhibited this behavior. Also, distortions, and immature drawings are noted for five LD and no control subjects. Enlargement of the designs, to the extent of using a whole sheet of paper for each design, was demonstrated by six LD and no control subjects. Three LD students and one control subject used sketchy lines to help them make the final drawings. And, two LD students worked from right to left.

Therefore, the learning disabled students have more scorable errors than controls and also exhibit coping strategies such as counting, enlargement and turning the materials, to help them with the task of visual-motor integration. The students who exhibited compensatory behaviors seem to need an intermediate step between looking at each design and reproducing it. For LD students, playing with the cards or using sketchy lines to construct a drawing may serve the same function in visual-motor tasks as talking around a topic serves in verbal conceptual tasks. These behaviors may give LD students added time as well as getting them into the range of a correct response so that they then can narrow the field and perform a correct response.

## Wechsler Adult Intelligence Scale-Revised

The qualitative aspects of the WAIS-R were analyzed using the guidelines of the prepared form, which appers in Appendix D. The qualitative findings are presented for each subtest.

### Information

Ten LD students and two control subjects showed difficulties with retrieving information accurately. Three LD and no control subjects made the mistake of saying "Neil" for "Louis Armstrong"; one LD student gave the response "Martin Luther" when "Martin Luther King" was required; and one LD student responded "Alfred" rather than Albert Einstein." No control subjects demonstrated this type of name confusion and substitution. Controls did have incorrect answers, but they were not wrong due to subtle differences leading to confusion in names. This observed difficulty with names on the Information subtest is corroborated by interview data in which LD students recognize problems with retrieving details correctly.

### Digit Span

On the Digit Span subtest, some students in both LD and control groups used chunking the digits and some repeated them in a straight pattern. Only one control subject added extra digits, but 11 LD subjects did. However, 10 LD and five control subjects dropped digits at least once. One area of behavior for the digit span subtest had a trend of differences between LD and control subjects. Thirty six LD subjects and 10 control subjects showed reversals in their answers, a statistically significant finding. More LD students than controls expressed reversals. This finding is particularly interesting for it is often thought that LD students outgrow their symptoms as they get older. Yet, here, as in the responses on the Bender Gestalt, LD college students continue to exhibit the same kinds of problems characteristic of young children with learning disabilities.

### Vocabulary

On the vocabulary subtest, eight learning disabled subjects used some of the vocabulary words in a sentence before giving a synonym. No control subjects exhibited this behavior. In other words, these LD subjects used the word first in a context, and then tried to extract a definition or synonym for their answer. These LD students exhibited a two-step process, whereas none of the other 48 LD subjects or 24 control subjects used this method. Therefore, fifteen percent of the LD students seemed to require a two-step process to generate definitions to vocabulary words. This observation corroborates reports of LD students needing more time to do various aspects of work. It also points to a possible coping strategy of providing an intermediate bridge when required to do conceptual work.

In the interview data, several Ld students also mentioned talking around a subject to help them organize their thoughts or to give them time to find a word to use when they couldn't think of a specific word.

In addition, four LD students were noted as exhibiting language and syntax problems on both the Information and Vocabulary subtests. No control subjects were observed experiencing such difficulties, another corroboration of the testing data.

### Arithmetic

Thirteen LD students and two controls asked for one or more problems to be repeated on this subtest. That 13 LD students did request repetitions may be another indication of auditory memory problems. Five LD students repeated at least one arithmetic problem back incorrectly, as did one control subject, another possible indication of auditory processing problems for LD students. One LD student was observed solving problems subvocally, a technique another LD student reported using when doing silent reading. An intermediate step in this case, subvocalization, seems to aid one LD student. This type of behavior would be more common for youngsters, but this particular student still utilizes it. Also, two LD students covered their eyes, apparently attempting to concentrate better, when solving the arithmetic problems. No control subjects exhibited this behavior.

### Comprehension

Twenty LD and four control subjects were noted talking around the point on this subtest. Therefore, some LD subjects use talking around a point as a compensatory strategy. No trends of differences between LD and control subjects were observed in use of concrete or abstract approaches.

### Similarities

No trend were observed differentiating the two groups.

### Picture Completion

Twelve LD and six control subjects named nonessential detail. Four LD students and three control subjects had difficulty with expressing the correct name. One LD student pointed to the missing part and then gave the correct name a few seconds later, exhibiting a motor response and then a verbal one. This tendency again indicates that a behavior at a lower developmental level, in this case the motor behavior of pointing, seems to be used by a learning disabled student as a bridge to the higher conceptual level requiring lanaguage output.

## Picture Arrangement

Two LD students were noted as arranging their stories from right to left, and one LD student told an entire story backwards. Seven LD students were noted as missing essential details. One LD student turned each card over as he told his story. Again, although the numbers are small, problems with directionality and motor responses are noted for LD subjects. No control subjects exhibited these behaviors.

## Block Design

No trends of differences between LD and control subjects emerged. Both LD and control subjects used gestalt and trial-and-error strategies. However, two LD students and no control subjects exhibited the behavior of seeming not to look at one stimulus picture in creating a design. These two students in the LD group seemed to work better without going back and forth between the stimulus and blocks, the procedure used by most subjects. Two subjects had also covered their eyes for concentration during the Arithmetic subtest, suggesting a need to block extraneous stimuli. Perhaps the stimulus of the block design card interfered with a correct response for the two LD students who didn't look at the designs.

### Object Assembly

Five LD students didn't recognize the hand when it was completed. One control subject had this difficulty. Otherwise, no noteworthy differences emerged between LD and control groups. Control subjects seemed to exhibit equal proportions of strategies used and problems encountered on this subtest as LD subjects.

### Digit Symbol

The only observed difference between LD and control subjects occurred when the students were asked to write the correct symbols from memory immediately after completing the Digit Symbol subtest. Five LD students and no controls drew reversed symbols for one or more digits. This is the same type of behavior as noted on the Digit Span subtest, where LD students had more reversals than control subjects.

### Overall Trends

Problems with various aspects of language were noted for LD students as they completed the WAIS. Subtle language mistakes, such as saying"hitiful" for "pitiful", "pacific" for specific," and "heart feelings" for "hard feelings" were noted. Word retrieval problems were also exhibited by some LD students. One student, in formualting an answer, said, "Wrench... whh.....clamp... whh - wrench, that's it." Another one said, "You know, a foot thing" when he meant "boot." Several learning disabled subjects had frequent long pauses before they finally expressed answers. Control subjects did not exhibit these behaviors. Therefore, process analysis of the WAIS yielded qualitative differences between LD and control subjects and a variety of descriptions of problems and coping strategies.

## Comparison of Good and Poor Academic Performance LD Subjects

When the good and poor academic performance LD subgroups were compared on behaviors exhibited in testing, few difference emerged. The two subgroups had similar problem areas and coping strategies on their responses to the Bender Gestalt and WAIS subtests. In general, it was not possible to isolate partiuclar strategies used by subjects in either the good or poor academic performance LD group.

One exception to no differences between good and poor academic performance LD groups occurred for the Digit Span subtest. Fourteen students in the good academic performance LD group had at least one reversal, and twenty-two students in the poor academic performance group had at least one reversal. The poor academic performance LD subjects had more reversals, perhaps indicating more problems in auditory sequential memory than good academic performance LD subjecs. A second difference in processes used on the WAIS by the two LD subgroups occurred in the Arithmetic subtest. Four students in the good academic perforamnce LD group and nine students in the poor academic performance LD group asked for one or more problems to be repeated. This, too, indicates more problems with auditory processing and/or auditory memory for the poor academic performance LD group when compared to the good academic performance LD group.

On the Comprehension subtest, four students in the good academic performance LD group and nine LD students in the poor academic performance LD group were noted as giving concrete responses. Therefore, more students in the poor academic performance LD group give concrete responses than students in the good academic performance LD group. This is an indication of poorer expressive language skills and/or poorer conceptual abilities for poor academic performance LD subjects than good academic performance LD subjects.

Therefore, in three areas, the poorer academic performance LD subjects show more problems than the good academic performance Ld subjects. There were no other differences found between good and poor LD subjects on process analysis of the Bender-Gestalt and WAIS.

Hypothesis 6a.

College students with learning disabilities and indicators of learning disabilities have more areas in which learning is blocked than college students without learning disabilities and indicators of learning disabilities.

## Comparison of LD and Control Subjects

One interview question asked if there were any areas of college work in which learning was blocked. The results appear in Table 50.

There were no significant differences between LD and control subjects on numbers of reported areas in which college learning is blocked. The specific descriptions, however, do show some different trends for the two groups.

Control subjects said they were blocked in math (two subjects), economics (two subjects) and sciences (one subject). Some learning disabled subjects mentioned specific academic areas as blocked. Math was cited by three LD subjects, science by three LD subjects, accounting by onesubject, and foreign languages by one subject. However, the learning disabled students also cited learning tasks and processes not mentioned by controls. Three LD students said they are blocked in spelling, two described blocks in the test-taking, two students said fear of not learning blocks them, and two LD students mentioned not being able to understand graphs. One LD student said he can't deal with lectures, that he needs more

## Table 50

### Comparison of LD and Control Subjects on Learning Blocked in College

| | LD (N=56) | Control (N=24) | $X^2$ | Sig. Level of $X^2$ |
|---|---|---|---|---|
| Yes | 19 | 5 | | |
| No | 36 | 19 | 1.50 | n.s. |
| Didn't Know | 1 | 0 | | |

time to understand the information. Finally, one LD student discussed his inability to write without revisions, as is necessary during an in-class essay examination. Therefore, although hypothesis 1a is not supported by the statistical analysis of number of areas in which college learning is blocked for LD compared to control subjects, interview data does provide insights into the different areas of learning that are blocked for LD when compared with control subjects.

Hypthesis 6b:

College students with learning disabilities and indicators of learning disabilities who have good academic performance in college have less areas in which learning is blocked than college students with learning disabilities and indicators of learning disabilities who have poor academic performance in college.

## Comparison of Good and Poor Academic Performance LD Subjects

The results for comparison of good and poor academic performance LD subjects responding to the question on areas of college learning blocked are found in Table 51.

No significant differences emerged when good and poor academic performance LD subjects were compared on reported areas of learning blocked in college. The qualitative descriptions do not yield any trends toward differences when comparing good and poor academic performance LD subjects.

Table 51

Learning Blocked, All LD Subjects

| | Good Academic Performance LD (N=28) | Poor Academic Performance LD (N=28) | $X^2$ | Sig. Level of $X^2$ |
|---|---|---|---|---|
| Yes | 8 | 11 | <1 | n.s. |
| No | 19 | 17 | | |
| Didn't Know | 1 | 0 | | |

## Comparison of Highest and Lowest Academic Achievement LD Subjects

The highest and lowest academic performance LD subjects were compared on their answers concerning areas of college learning that were blocked for them. The results appear in Table 52.

No differences emerged when highest and lowest academic performance LD subjects were compared on number of reported areas blocked in college. Therefore, Hypothesis 6b is not supported by interview data.

## Discussion of Hypotheses 6a and 6b

The statistical analyses do not support the prediction of more college students with learning disabilities reporting areas of blocked learning than controls, and more poor academic performance LD students having areas blocked than good academic performance LD subjects. These findings are contrasted with those of Hypothesis 4a, where college students with learning disabilities experienced significantly more academic areas hard than controls. However, one explanation may reconcile the two seemingly contraditory findings. Experiencing areas of acdaemic difficult is different than being blocked in academic learning. Therefore, LD students may experience more difficulty with college work than controls, but the LD students in this population do not differ from controls in numbers of areas blocked.

## Table 52

## Comparison of Highest and Lowest Academic Performance LD Subjects on Learning Blocked in College

| | Highest Academic Performance LD (N=19) | Lowest Academic Performance LD (N=18) | $X^2$ | Sig. Level of $X^2$ |
|---|---|---|---|---|
| Yes | 7 | 6 | <1 | n.s. |
| No | 12 | 12 | | |

Another explanation may be possible. Those LD students with learning blocks may have not been included in the study population. In other words, if LD students would have areas of learning that are impossible for them in the competitive college setting they might not have been admitted to Clark or have been able to remain at Clark once admitted. The researcher has learned that one LD subject in the lowest academic performance group who has indiciated areas of blocked learning in college subsequently left Clark University. Therefore, some LD and control subjects do indicate that areas of college learning area blocked for them. One obvious coping strategy is avoidance of those areas. Students, both LD and control, who encounter extreme difficulty with math, for example, simply elect other courses and are able to get by. However, LD students report significantly more difficulty with the courses they do take than controls.

These results indicate that learning disabled students at a selective college may need resources to help cope with difficult academic demands or particular subject areas. However, that more LD students do not indicate areas of blocked learning than control subjects would indicate that exemptions from courses are not necessary for these LD students. Exploration of LD students who do not continue in their college programs and reasons for dropping out or transferring may shed further light on the topic of blocked learning for LD college students.

# CHAPTER 5

# CONCLUSION

The three major areas of concern in this exploratory study of college students with learning disabilities at a selective four-year university were characteristics of LD college students, coping strategies developed to deal with college demands and barriers to learning for this group. The study was somewhat exploratory in both nature and methodology. This particular population of learning disabled students has not been systematically studied. The methodology provided for a variety of psychoeducational data coupled with qualitative information from interviews and examination of work products.

A major strength of the study, its broad-based approach, may also have led to certian limitations. Because of the lack of prior studies about this population, the researcher chose not to limit the study to one particular area, such as language functioning or patterns on intelligence tests. Instead, in trying to obtain an overview of the population without closing off areas of concern, the study utilized a wide range of assessments. The study became complicated and sometimes administratively unwieldly, including the giving and scoring of 314 questionnaires, soliciting subject participation, scheduling 81 subjects for 4-1/2 hours of assessments, scoring those assessments, and transcribing and analyzing the mass of data collected.

However, despite many frustrating moments including the time when the Spring, 1982 University term drew to an end with one subject still cancelling and missing scheduled appointments, the methodology did permit a broad-based approach. Now that many bases have been touched, the ones which merit further research seem clearer than before.

Furthermore, the inclusion of students in the study population who were never diagnosed as learning disabled but showed marked learning problems was a departure from ususal designs and yielded valuable information. As a follow-up to this study, the researcher plans to compare those students with diagnosed learning disabilities with those students in the study population who had never been so diagnosed.

The questionnaire served both to locate subjects with indicators of learning disabilities as planned, and also to bring to the surface twelve students who had been diagnosed as learning disabled, an unanticipated result. None of these twelve students with diagnosed learning disabilities had requested any college assistance due to having a learning disability. However, the existence of these students who had requested no special help leads to further speculation about the incidence of learning disabled students in a selective college population. If 12 of 314 students completing a questionnaire have been diagnosed learning disabled, how many students of a 2000 student undergraduate body have learning disabilities? Furthermore, if a good number of students miss both presented auditory memory or copying tasks on a questionnaire, and if many, many students indicate that they aren't learning as well or as much as they'd like, the results of the questionnaire may point to a need for further detailed exploration of the interaction of student learning styles and abilities with the academic demands of a selective college setting.

## Psychoeducational Assessments

The results of the psychoeducational assessments pointed to some similarities of college LD students with younger learning disabled populations. But there were also some surprises. For the present population, sequencing and timed tasks, language abilities, especially writing and expressive language, spelling, math and reading achievement are the key variables differentiating learning disabled from non-learning disabled subjects. The learning disabled subjects had poorer performance than controls in all of these areas. Learning disabled students also exhibit a wider range of subtest scatter when compared to controls. However, the learning disabled students have verbal conceptual abilities on the Wechsler equal to control subjects.

The _Test of Adolescent Language_, although designed for a high school population, seems promising as a diagnostic tool for use with college students with learning disabilities, since the results of using it with a college LD population produced the same patterns as reported testing with high school students.

When good and poor academic performance learning disabled subjects are compared to each other on the variables of the psychoeducational assessments, few differences emerge. However, when the LD students with college grade-point averages in the middle range of the learning disabled subjects are left out, and the highest and lowest academic performance learning disabled subjects are compared, the highest academic performance LD subjects having higher scores on 36 of the 39 psychoeducational variables than the lowest academic performance LD subjects.

A comparison of control, highest academic performance LD subjects and lowest academic performance LD subjects leads to another pattern. For 32 of 39 psychoeducational variables, control subjects have the best scores, highest academic performance LD subjects have the middle scores, and lowest academic performance LD subjects have the worst scores. However, on six variables, the highest academic performance LD subjects have the best scores. These variables measure verbal conceptual ability. Therefore, the highest academic performance LD subjects in the sample exhibit clear strengths in verbal conceptual abilities combined with deficits in all other areas measured.

The findings highlight the importance of studying learning disabled students by specific groups according to identified criteria. The comparison of the total group of LD students to controls yielded different patterns than comparisons of subgroups of the learning disabled population to each other and to controls. An important finding of the present study is the isolation of a pattern of strength in verbal conceptual abilities for the highest academic performance learning disabled subjects at Clark University.

## Past Background

The sample subgroups were compared to each other on past academic background and physical characteristics. Learning disabled subjects reported experiencing more academic areas hard and reported receiving more help in both elementary and high school than control subjects. A trend occurred of more learning disabled students in the sample being left-handed, wearing glasses, and reporting mixed dominance, signs associated with younger children with learning disabilities.

When the subgroups of learning disabled students were compared to each other, there were no significant differences observed in variables relating to academic background and physical characteristics.

## College Experience

In probing the various academic tasks in college, more LD students reported difficulty with academic areas than controls. However, there is no difference in overall help received in college by LD and control subjects. This may occur because the specialized help does not exist. Secondly, more control subjects report seeking help in college than in past schooling, so differences between LD and control subjects in help in earlier schooling are not as great as earlier.

No differences in use of time as reported on the time logs emerged between LD and control subjects. On ratings of actual college papers and exams, more LD students received low ratings than controls in 4 of 9 categories. The LD subjects received lower ratings than controls on neatness, ideas and spelling on exams, and grammar on papers. More learning disabled students perform worse in the in-class exam situation than on papers. Therefore, the method of expression required for college work seems to be an important factor in academic achievement for learning disabled students.

When the learning disabled students were compard to each other by subgroups, fewer good academic performance LD subjects reported experiencing difficulty with papers than poor academic performance LD subjects. The good and poor academic performance LD subjects did not differ on the time log and exam ratings, but did show differences in grammar and spelling on papers. The comparison of highest and lowest academic performance LD subjects showed similar findings, therefore, differences in college functioning of good and poor academic performance LD subjects did emerge in the paper situation. Learning disabled students with good academic performance seem to utilize the extra time allowed in the paper situation to use compensatory strategies.

### Past Coping Strategies

There were no differences between LD and control subjects on methods of learning reported in past learning. However, significantly more LD subjects than controls reported difficulty with written expression in past learning. Help by school personnel, private tutoring and family help in elementary school were reported by more LD than control subjects. In high school more LD students than controls reported help by school personnel. No significant differences were found in methods of learning and methods of expression in past learning when good and poor academic performance LD subjects were compared. The two groups also showed no differences in kinds of help received in the elementary and high school years.

Similarly, comparison of highest and lowest academic performance LD subjects on methods of learning, methods of expression, and help received in past learning yielded no significant differences.

## College Coping Strategies

The only difference between LD and control subjects in reported help received in college was in the area of use of university resources. The LD students utilized the university resources more than controls. No differences occurred in comparisons of good and poor academic performance LD subjects and comparisons of highest and lowest academic performance LD subjects on reported kinds of help received in college.

## Qualitative Data Pertaining to Coping Strategies

### Coping Strategies of LD and Control Subjects

The qualitative data about past and present learning provided some interesting information about problem areas and coping strategies for college students with learning disabilities.

When the learning disabled and control students were compared on problem areas and coping strategies discussed in the interviews, several themes emerged. The area of reading, including reading method, comprehension, conceptualization, and time was mentioned far more frequently by LD than control subjects.

Several LD students mentioned good reading comprehension as a strength in learning, and eight LD students felt reading comprehension problems hindered them. No control subjects discussed reading comprehsnion. Ten LD students felt strengths in conceptualization aided them, and 11 LD student cited probelms in reading comprehension. The LD students citing strengths in comprehension and conceptualization provide qualitative support for the lack of differences found in verbal conceptualization on the psychoeducational assessments when LD and control subjects were compared. Reading time was also a problem for LD students.

Needing more time and time pressures were discussed by many LD students, and only a few control subjects. Extra time was both a stress and a useful coping strategy for LD students. Learning disabled students were acutely aware of needing extra time to perform well. That learning disabled students received better ratings in the papers than the exams analyzed in the research partially confirms the necessity of extra time enabling LD students to achieve in college.

Many LD students discussed memorization some citing strengths in memorization as a coping strategy, while more LD students experienced problems with memorization. Memorization was not discussed by any control subjects.

Problems with grammar and details were also cited by a large number of LD subjects. Coping strategies used to deal with these problems included looking things up in reference sources, using conceptual skills to solve problems of missing details, and putting details into meaningful contexts.

Problems with drawing and copying continue in college for the LD students. Also, trouble with extemporaneous speaking and word finding problems are discussed by some LD students. Several LD students reported constructing new sentences in speaking or writing when they can't find a proper word to express their ideas.

Organization was cited by many LD subjects. A few LD subjects use good organizational abilities to help them, while others have problems with organization.

Dropping subjects that are too hard or avoiding difficult subjects was used as coping strategy by LD subjects. Several control subjects also make use of the freedom of the college setting to avoid difficut subjects.

Several LD students describe spending extra effort to meet academic requirements. They know they have to work harder than students without learning disabilties and they do put in the required effort.

## Coping Strategies of Good and Poor Academic Performance LD Subjects

A few trends seem to emerge when coping strategies of good and poor academic performance LD subjects are compared. Good reading comprehension is cited as a strength by several LD students in the good academic performance group and only one LD subject in the poor academic performance group. However, six LD students in the poor academic performance group report reading comprehension problems. Comprehension strengths may help some LD students compensate for problems with other aspects of reading and language, such as details, spelling, grammar and syntax.

More LD students in the poor academic performance LD group report problems with grammar than students in the good academic performance LD groups. Also, two good academic performance LD subjects report that they are more diligent in keeping up with day-to-day work, and 5 good academic performance LD subjects describe how they must be self-disciplined in their academic work. No students in the poor academic performance LD group mention these two areas.

Strengths in verbal expression are mentioned by two students in the good academic performance LD group and none in the poor academic performance LD group. Two LD students in the good academic performance LD group use paid typists to cope with their poor spelling, grammar and syntax problems. Finally, a sense of humor seemed to characterize several of the good academic performance LD subjects and none of the poor academic performance LD subjects.

## Process Analysis of Psychoeducational Assessments

The process analysis of the psychoeducational assessments showed more areas of immature behavior for LD than control subjects. When LD and control subjects were compared on the various subtests, the LD students had both verbal and pictoral reversals, directional difficulties, sequencing problems, and poor quality of reproduced designs. Learning disabled students exhibited memory difficulties. Various problems with language, including expressive difficulties, substitution, word-retrieval problems and talking around a point were exhibited by LD students. Using excess verbiage and motor behaviors, such as handling stimulus cards, pointing, and finger-tracing, seem to help some LD students finally create a correct response.

It is hypothesized that LD students use behaviors at lower developmental levels to enable them to handle conceptual tasks.

When the good and poor academic groups were compared, few differences emerge. More reversals, more concrete responses, and more repetitions are characteristic of the poor academic performance group.

## Learning Blocked in College

There were no significant differences in numbers of LD and control subjects reporting learning blocked in college and no differences in this area reported among the LD subgroups.

## Overall Trends

The findings show that college students with learning disabilities are different from controls in some areas of ability and academic achievement. Perhaps it is appropriate to provide continued remediation for college students with learning disabilities in the areas of reading comprehension, vocabulary skills, spelling, basic math skills, written and oral language development, and study skills. These areas, with the exception of writing, are not presently addressed at Clark University. The immature behaviors shown by the LD subjects on the psychoeducational assessments may be an indication that some LD college students are, in fact, delayed in some aspects of maturation. If cognitive development is not complete, perhaps continued academic remediation efforts could foster continued development for these students.

Learning disabled students report most difficulty in the in-class exam and paper situation. Yet, analysis of work products shows that in the exam situation, learning disabled students exhibit the most problems. Their problems are not in the areas of ideas, but rather in grammar, spelling, and neatness. Learning disabled students also report significant problems with tasks requiring memory and attention to details. The paper situation allows for the higher academic performance LD subjects to cope with deficits. Their strategies, such as utlizing proofreaders and doing more rewrites could easily be taught to other learning disabled college students.

The issue of time is an important one for college students with learning disabilities. Needing more time to process individual tasks and elicit responses as well as needing more time, overall, for reading, studying, and doing assignments is a reality for college students with learning disabilities. Ways of learning to organize and structure their time would benefit many LD students. Colleges and universities could administratively deal with this variable by allowing reduced course loads, extensions for course completion, etc.

## Future Directions

The interview in this study provided unanticipated observations. Most students wanted to talk at length about themselves and their learning problems. The initial few interviews ran as long as three hours. The realities of time - both for the research assistants administering the interview and the researcher who then transcribed interview data, forced setting limits on the length of interviews. However, the lengthier interviews did allow for detailed discussion of problems and methods of coping. A future study could be devoted to detailed interviewing of a smaller number of LD students to pinpoint and more fully describe coping strategies.

The scheduling complications, missed appointments, and general unreliability of the LD subjects was quite a contrast to behaviors exhibited by control subjects, who rarely cancelled or missed appointments. The way in which college students with learning disabilities organize themselves to meet the demands of the college curriculum, including scheduling, organization of study time, and just physically getting themselves to the right place at the right time merits further investigation.

A wide range of problem areas and coping strategies were explored. Certain problems were cited again and again: reading difficulties, problems with time, memory difficulties, problems with grammar, detail, and overall organization. Some students were very conscious of techniques used to compensate for deficits; other students did not possess as much insight into their own behaviors. It seems that those LD students with expressive and/or receptive language strengths are most able to compensate for other deficits. Those LD students with relative verbal conceptualization deficits and performance strengths achieve less well in college. The more successful LD students seem to realistically accept their situation. They know they are at a disadvantage, and consequently they work harder, are more disciplined and persistent, and generally make more of an effort to keep up with assignments. The less successful LD students often rely upon avoidance tactics and use their problems as an excuse when faced with difficult tasks.

The barriers to learning for LD students are individual to the student. Depending upon the student's own aspirations, different areas of learning may be problematic for LD students. However, the regularity with which problems with time, memory and organization were cited along with the ratings of actual exams and papers indicate that some demands inherent in the college situation may also constitute barriers for LD students. As more and more students with learning disabilities attend college, and this study identified 12 of 314 students surveyed as learning disabled, colleges will be faced with difficult decisions about alternatives for acceptable academic performance. However, the findings of this exploratory study indicate that learning disabled students attending a selective university are equal to control subjects in conceptual abilities, and that the learning disabled students with the highest academic performance in college actually possess higher skills in verbal conceptualization than control subjects. These findings substantiate the notion that learning disabled college students do possess both learning strengths and compensatory strategies to deal with learning problems. Therefore, the next task facing colleges and universities will be a search for methods which allow learning disabled students to learn and express their learning to the fullest capacity.

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# APPENDICES

## Appendix A: Interview Schedule

Original Interview Schedule
Revised Interview Schedule

## Appendix B: Forms Used for Student Work Products

Time Log
Rating Sheet for Exams and Papers

## Appendix C: Letters to Faculty for Subject Solicitation

Letter from Dean of Students
Letter to English Department Instructors
"The Learning Disabled Student at Clark University"

## Appendix D: Psychoeducational Assessments, Qualitative Information

Psychoeducational Assessments, Qualitative Information

## Appendix E: Correspondence with Subjects

Original Note for Participation
Participant Consent Form
Memo, Oct. 26, 1981
Memo, Nov. 13, 1981
Memo, Nov. 13, 1981
Memo, Jan. 15, 1982
Memo, Jan. 22, 1982
Memo, Feb. 2, 1982
Memo, March 22, 1982
Memo, April 13, 1982

## Appendix F: Vitae

Joan Axelrod, Research Assistant
Lynn Hallback, Research Assistant
Martha Wally, Research Assistant
Gertrude Webb, Consultant
Sylvia Fleisch, Consultant

# Appendix G: Additional Statistical Information

Grade Point Average of Sample Subgroups
Standard Deviations on Psychoeducational Assessments for LD and Control Groups (Table 16a)
Standard Deviations on Psychoeducational Assessments for Good and Poor Academic Performance LD Groups (Table 17a)
Standard Deviations on Psychoeducational Assessments for Highest and Lowest Academic Performance LD Groups (Table 18a)

# APPENDIX A

## ORIGINAL INTERVIEW FORM

### Interview Schedule Introduction

Hello, ______________. I'm ____________________. As you know, I am studying learning differences and learning problems experienced by Clark undergraduates. I have a series of questions I would like to ask you. I will be asking you to reflect upon how you learned in the past and how you are learning now.

### Interview Schedule

Student Number __________

1. Personal Data

    Birthdate

    Age

    Major

    GPA

2. Medical History

    Are you right or left handed?

    Do you wear glasses? Contact lenses?

    Do you wear a hearing aid?

    Do you have any physical disabilities?

Interview Schedule (page 2) Student Number ________

## 3. Family Members with Learning Disabilities/Reading Problems

Are there members of your immmediate family with learning problems? Reading problems? Who? Please elaborate.

## 4. Past Academic History

What was learning in elementary school like for you? What was easy? What was hard?

What was learning in junior high like for you? What was easy? What was hard?

What was learning in senior high like for you? What was easy? What was hard?

What were your learning strengths in elementary, junior high, senior high school?

What were your learning difficulties in these years?

How did you cope with learning difficulties?

(Leave it open) if student needs help, ask about:

self-developed strategies
family help
special services in school
special tutoring out of school
help by friends
help by teachers
others

## 5. Current Academic Functioning in College

In reflecting on your college experience, what things have been easy for you?

In reflecting on your college experience, what things have been hard for you?

What do yo do when you have difficulties in learning? (If students don't mention, ask about help from friends, help from faculty, use of University resources, use of time, tutoring)

How do you study?

How do you do your reading assignments?

How is your note-taking during classes?

What are objective exams like for you?

What is doing papers like for you?

What are oral presentations like for you?

6. Are there any other areas or issues you would like to discuss?

## REVISED

## INTERVIEW SCHEDULE

Student Number ________

A. Personal Data

Birthdate: ______________________________

Age: ______________________________

Major: ______________________________

GPA: ______________________________

****************************************************************

B. Past Academic History

| | |
|---|---|
| 1. What kind of schools did you attend?<br>Public _____ Private _____<br>(if private, get name) | 1. (Write Type)<br>__________________ |
| 2. Were there any changes on the type of schooling you received? (Ex - from private to public school - get details) | 2. Yes_____ No_____ |
| 3. At which grade did you change from a self-contained classroom group to a separate teacher for each subject? | 3. __________________ |

Elementary School

| | |
|---|---|
| 4. As you think back to your early schooling, was learning in elementary school easy or hard for you? (if they waver - if you had to decide overall, was it easy or hard?) | 4. Easy_____ Hard_____ |

| | |
|---|---|
| 5. Let's think about these subjects. What were they like for you? If they were hard for you, did you develop any strategies to help you? | |
| a. Reading<br>Did you learn to sound out words or to recognize words by what they looked like?<br>Phonics____ Sight Method____ | a. Easy_____ Hard_____ |
| b. Spelling | b. Easy_____ Hard_____ |
| c. Handwriting | c. Easy_____ Hard_____ |
| d. Coloring | d. Easy_____ Hard_____ |
| e. Arithmetic | e. Easy_____ Hard_____ |
| f. Phys. Ed. | f. Easy_____ Hard_____ |
| g. Music | g. Easy_____ Hard_____ |
| h. Others | h. Easy_____ Hard_____ |
| 6. In elementary school, was it easy to learn | |
| a. in a small group? | 6(a) Yes_____ No_____ |
| b. if you were shown material? | (b) Yes_____ No_____ |
| c. if you were told about material? | (c) Yes_____ No_____ |
| 7. In elementary school, could you present material you learned in the following ways: | |
| a. Orally | 7(a) Yes_____ No_____ |
| b. In writing | (b) Yes_____ No_____ |
| c. In pictures | (c) Yes_____ No_____ |

| | |
|---|---|
| 8. Did anyone help you with learning problems in elementary school? | 8. Yes_____ No_____<br>(Write letter for Yes) |
| a. During school day, by school personnel | a. ______ |
| b. After school, by school personnel | b. ______ |
| c. After school, privately | c. ______ |
| d. Family help | d. ______ |
| e. Help by friends | e. ______ |
| f. Others | f. ______ |
| 9. Did you have activities or interests outside of school during the elementary years? Please describe. | 9. Yes_____ No_____ |

## Junior-Senior High School

Now let's think about junior and senior high school.

| | |
|---|---|
| 10. Was learning in those years easy or hard for you? | 10. Easy_____ Hard_____ |
| 11. Let's think about these subjects and skills during the junior and senior high school years. What were they like for you? If they were hard, did you develop any strategies to help you? | |
| a. Reading | 11a Easy_____ Hard_____ |
| b. Writing Papers | 11b Easy_____ Hard_____ |
| c. Mathematics | 11c Easy_____ Hard_____ |
| d. Science | 11d Easy_____ Hard_____ |

| | |
|---|---|
| e. Foreign Language | 11e Easy_____ Hard_____ |
| f. Phys. Ed. | 11f Easy_____ Hard_____ |
| g. Others | 11g Easy_____ Hard_____ |
| 12. In these years, did you learn easiest | |
| a. if you were shown material | 12a Yes_____ No_____ |
| b. if you were told about material | b Yes_____ No_____ |
| 13. Did anyone help you with learning problems in junior-senior high scool? | 13. Yes_____ No_____<br>(Write letter for Yes) |
| a. During school day, by school personnel | a. ______ |
| b. After school, by school personnel | b. ______ |
| c. After school, privately | c. ______ |
| d. Family help | d. ______ |
| e. Help by friends | e. ______ |
| f. Others | f. ______ |
| 14. Did you have any activities or interests outside of school during the junior-senior high school years? Please describe. | 14. Yes_____ No_____ |

## C. Current Academic Functioning in College

| | |
|---|---|
| Now we'll turn to the college years. | |
| 15. In reflecting upon your college experiences, has it been easy or hard? | 11. Easy_____ Hard_____ |
| 16. Which subjects or areas have been easy for you in college? | 16. |
| 17. What areas have been difficult for you in college? | 17. |

| | |
|---|---|
| 18. How do you cope with difficultiers in learning here at Clark? | 18. |
| 19. Does anyone help you with learning problems? | 19. Yes_____ No_____<br>(Write letter for Yes) |
| a. friends | a. Yes_____ No_____ |
| b. faculty (who, which subjects) List: | b. Yes_____ No_____ |
| c. Use of University Resources (Writng Center, Math, Historical) List: | c. Yes_____ No_____ |
| d. tutoring (Which subjects) | d. Yes_____ No_____ |
| e. family | e. Yes_____ No_____ |
| f. Other - Describe: | f. Yes_____ No_____ |
| I'd like to focus on some areas of learning in college. | |
| 20. How do you study? (alone, with others, at a set time) | 20. |
| 21. Are you able to do your reading assignments easily? | 21. Yes_____ No_____ |
| 22. Are you able to take notes during class easily? | 22. Yes_____ No_____ |
| 23. Are objective exams easy for you to take? | 23. Yes_____ No_____ |

| | |
|---|---|
| 24. Are essay exams easy for you to take? | 24. Yes_____ No_____ |
| 25. Are you able to write papers easily? How do you go about writing papers? (Get description) | 25. Yes_____ No_____ |
| 26. Are you able to do oral presentations easily? | 26. Yes_____ No_____ |
| 27. Are you able to express your thoughts in classroom discussions? | 27. Yes_____ No_____ |
| 28. Are there any areas in which you are unable to learn, that learning is blocked for you? (Please describe) | 28. Yes_____ No_____ |

## D. Physical Background and Data

Now I'd like to ask some questions about your physical background.

| | |
|---|---|
| 29. Are you right or left handed? | |
| a. Which hand do you work with? | 29a Right_____ Left____ |
| b. Throw a ball with? | b Right_____ Left____ |
| c. Play tennis with? | b Right_____ Left____ |
| d. Kick a ball? | c Right_____ Left____ |
| Do anything with other hand? | Yes_____ No_____ |
| 30. Do you wear glasses or contact lenses? | 30. Yes_____ No_____ |
| 31. Do you wear a hearing aid? | 31. Yes_____ No_____ |

| | |
|---|---|
| 32. Do you have any physical problems? (If so, please describe) | 32. Yes_____ No_____ |

## E. History of Learning Problems, Self and Family

| | |
|---|---|
| 33. Were you ever diagnosed as having a learning disability? | 33. Yes_____ No_____ |
| If yes, when it was first identified? | (Write letter) |
| a. preschool | a. _______ |
| b. elementary school 1-6 | b. _______ |
| c. junior high 7-9 | c. _______ |
| d. senior high 10-12 | d. _______ |
| e. college | e. _______ |
| f. other | f. _______ |
| 34. Who was the first person to recognize a learning disability? | (Write letter) |
| a. I was | a. _______ |
| b. my parents | b. _______ |
| c. a teacher | c. _______ |
| d. family doctor | d. _______ |
| e. guidance counselor | e. _______ |
| f. other | f. _______ |
| 35. Do any of the following members of your family have a learning disability? | (Write letter) |
| a. father | a. _______ |
| b. mother | b. _______ |
| c. sister | c. _______ |
| d. brother | d. _______ |
| e. grandmother | e. _______ |
| f. grandfather | f. _______ |
| g. cousin | g. _______ |
| h. other | h. _______ |
| i. don't know | i. _______ |
| 36. Are there any other issues concerning learning we didn't cover earlier? | 36. |

THANK YOU

## APPENDIX B

TIME LOG WEEK OF:____________________ STUDENT NUMBER________

Instructions: Fill in the letter for the actvity you engaged in for most of each hour. Use code at the bottom of the page. Any other explanations, work on back. Return to Renee Goldberg, Education Dept.

**************************************************************

| | Mon. | Tues. | Wed. | Thurs. | Fri. | Sat. | Sun. |
|---|---|---|---|---|---|---|---|
| AM 6 | | | | | | | |
| 7 | | | | | | | |
| 8 | | | | | | | |
| 9 | | | | | | | |
| 10 | | | | | | | |
| 11 | | | | | | | |
| 12 | | | | | | | |
| PM 1 | | | | | | | |
| 2 | | | | | | | |
| 3 | | | | | | | |
| 4 | | | | | | | |
| 5 | | | | | | | |
| 6 | | | | | | | |
| 7 | | | | | | | |
| 8 | | | | | | | |
| 9 | | | | | | | |
| 10 | | | | | | | |
| 11 | | | | | | | |
| 12 | | | | | | | |
| 1-6 | | | | | | | |

Z = Sleeping C = Classes S = Studying M = Meals
L = Leisure Time O = Other (Please explain)

## Rating Sheet for Exams and Papers

Student #______________

**Exams**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 5. | Neat | 1 | 2 | 3 | 4 | 5 | Sloppy |
| 6. | Grammatical | 1 | 2 | 3 | 4 | 5 | Ungrammatical |
| 7. | Ideas clear | 1 | 2 | 3 | 4 | 5 | Ideas muddled |
| 8. | Spelling good | 1 | 2 | 3 | 4 | 5 | Spelling poor |

8a. Notes/Comments:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 9. | Organization good | 1 | 2 | 3 | 4 | 5 | Organization poor |
| 10. | Neat | 1 | 2 | 3 | 4 | 5 | Sloppy |
| 11. | Grammatical | 1 | 2 | 3 | 4 | 5 | Ungrammatical |
| 12. | Ideas clear | 1 | 2 | 3 | 4 | 5 | Ideas muddled |
| 13. | Spelling good | 1 | 2 | 3 | 4 | 5 | Spelling poor |

# APPENDIX C

CLARK UNIVERSITY
Worcester, Mass.

Office of the Dean of Students October 27, 1981

To: Faculty

From: Joyce Gibson
Dean of Students

RE: Students with Special Needs

Each year we enroll several students who require some special assistance in order to function at their best in their courses. Most of the students have either a physical or learning disabilitiy. I am aware of many of these students, who identify themselves prior to enrollment, or at some point during the year. At the point of identification, my staff requests a documentation of the disability, when appropriate, and makes any reasonable arrangements to accommodate the special needs of the students. We are often in contact with professors to help us as well, particularly if a student desires some assistance in explaining why s/he needs special arrangements whether for examinations, taking notes, or some other classroom activity.

The purpose of this letter is: (1) to inform you of the fact that we offer some assistance to students with these special needs, and (2) to ask your assistance in referring such individuals to us when you identify them, or when you suspect that a student may need some assistance.

Last year, Renee Goldberg, an instructor in the Education Department worked with one of my staff--Candace Anderson, Associate Dean of Students--to develop a brochure of supportive services programs on campus for students with learning disabilities. (I will send one to each department chair). To date several students have been identified and offered services at Clark, along with referrals to the community for help with their learning disabilities. More recently Renee Goldberg received a grant from the Office of Education to continue her research on the study of college students with learning disabilities and learning problems. She and my staff work together to help the learning disabled at Clark. Students who you identify from classes or office contact, may be referred to her at 7293, as well as my staff, at 7423, 7424.

Students with physical disabilities are usually referred to my office or the Health Services. Barbara Driscoll, Director of Health Services, and I make every effort to meet the individual needs of these students. Though we do not have students yet with severe multiple physical handicaps, we have students with visual and ambulatory disabilities.

The University Committee on the Handicapped is currently developing a brochure to describe the facilities at Clark, and is very supportive and senstive to the needs of the disabled.

There are no standard ways of identifying students with special needs. I advise that you utilize the same mechanism that you use for referral of any student who you may suspect may be having difficult in your courses. So be prepared to make appropriate arrangements for assistance without jeopardizing the integrity of the course, or the desire of the student to learn. Most students with disabilities really do not want to be treated differently and do not want relaxed or easier course assignments.

If you have any questions or wish more information about our efforts, please contact me.

JG/p

## *RECORDINGS FOR THE BLIND*

Anyone having a visual, physical, or perceptual handicap which prevents him or her from reading normal printed material is eligible to borrow recorded educational texts from Recordings for the Blind.

Contact: Application available at Goddard Library

Services:

- Tape recorded textbooks for LD students, no charge
- Supplementary tactile representation of graphs and figures

## *COMMITTEE OF CONCERNED LD STUDENTS*

Recognizing the importance of communication among LD students at Clark, there is a Committee of Concerned LD Students. Committee members are available to talk with undergraduates, to acquaint them with resources available, share copings and strategies, and to provide support for each other.

Contact person: Renee Goldberg - 793-7293

Ms. Goldberg is in the Education Department and will handle coordination of the Committee.

Spring 1980

# The Learning Disabled Student
# at Clark University

The U. S. Office of Education states that students with specific learning disabilities exhibit a disorder in one or more of the basic psychological processes involved in understanding or in using spoken or written language. These may be manifested in disorders of listening, thinking, talking, reading, writing, spelling, or arithmetic...

Students with learning disabilities have average or above-average intellectual ability but exhibit specific learning problems. When a learning disabled (LD) student enters college, he or she must develop strategies to cope with the increased demands of the college curriculum.

At the present time, Clark University recognizes that there are a number of LD students on campus. Some pursue their studies without needing additional help. However, for those LD students who are experiencing difficulties, who may require some support, or who wish to learn more about their own learning styles and difficulties, resources are available.

### *EDUCATION DEPARTMENT*

The Education Department coordinates services for LD students at Clark. It receives referrals of students who may be learning disabled and serves as a consultant to LD students and to faculty.

Contact person: Renee Goldberg - 793-7293

Services:

- Evaluation of the learning disability through interview and psychoeducational testing where indicated
- Counseling with the student regarding his/her disability and methods of coping with it
- Consulting with the student's teachers regarding any adjustments that can be made
- Referring the student for additional services
- Locating students in the Education Department who are willing to read and tutor

### *DEAN OF STUDENTS OFFICE*

The Deans of Students can assist LD students who need modification of their course loads, personal counseling, or academic consultation.

Contact persons: Dean Joyce Gibson - 793-7549
Dean Candace Anderson - 793-7590

Services:

- Granting permission for modified course loads
- Consulting with the student's instructors about any necessary adjustments regarding course work, deadlines, and examinations
- Individual counseling

### *THE WRITING CENTER*

All Clark students are eligible to use the Writing Center. LD students may also utilize the tutors and attend workshops offered. The staff at the Writing Center is attuned to the possibility of learning disability in students exhibiting difficulties with written work, and will provide specialized assistance as needed.

Contact person: Dr. Leone Scanlon - 793-7469

Services:

- Tutoring in writing skills
- Aid for students in need of help with written work
- Help with organization and study skills
- Corrections of spelling; correction of written drafts of papers

### *MATH CLINIC AND TUTORIAL*

Individual conferences, diagnostic tests, programmed exercises, and projects are used to develop mathematical skills, concepts, and confidence.

Contact person: Dr. John Kennison - 793-7394

Services:

- One-to-one tutoring available to LD students experiencing difficulty with mathematics or to further mathematics skills.

### *GODDARD LIBRARY*

The Goddard Library provides a variety of services which can be utilized by the LD student whose problem may necessitate a multi-media approach to learning.

Contact person: Reference Librarians - 793-7578

Services:

- Oral study rooms
- Cassette decks and turntables for study needs
- Clark Library Information Program (CLIP), an intensive reference service to aid in doing library research

# APPENDIX D

## Psychoeducational Assessments
## Qualitative Information

Date Tested ______________________ Student # ___________

Examiner _________________________

*********

Bender Gestalt

Time: | Kinds of Errors

Scores

Card A ________

Card 1 ________

Card 2 ________

Card 3 ________

Card 4 ________

Card 5 ________

Card 6 ________

Card 7 ________

Card 8 ________

TOTAL SCORE ________

*********

Coping Strategies:

## WAIS - QUALITATIVE INFORMATION

### Information

_____ retrieving information inaccurately - i.e., role facts must be worked out

_____ alliteration

_____ confusion - i.e., continent for country

_____ other:

### Block Design

### Digit Span

_____ Chunks or _____ Straight

_____ Adding digits

_____ Dropping digits

_____ Reversals

_____ Perserverance

_____ Other:

### Vocabulary

_____ give functional definition before synonym (i.e., commernce firing, commence........)

_____ faulty syntax, grammar

_____ other:

Arithmetic

_____ ask to repeat problems

_____ do they repeat incorrectly

_____ math facts off

_____ other:

Comprehension:

_____ syntax problems

_____ concrete or _____ abstract

_____ talk around the point

_____ other:

Similarities:

_____ concerete or _____ abstract

_____ associations that are not similarities

_____ other:

Picture Completion:

_____ non-specific references (i.e., say thing, point instead of naming)

_____ other:

### Picture Arrangement

Get stones for #4. 6. 10

Comments:

### Object Assembly

_____ leave details out

_____ not know what completed object is

_____ others:

### Digit Symbol

Ask student to do it without looking.

Number correct _______

### General Comment:

(Again, unusual behavior, coping behavior, impressions, etc.)

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Score |
| | | | | | | | | | |

## APPENDIX E

### Original Note For Participation Request
### Fall 1981

To:

Date:

I am conducting a research study entitled "Learning Abilities, Learning Styles and Learning Disabilities in College Students." I would like to meet with you to discuss the possibility of your participation in the study.

There is a $20.00 stipend for participants.

Please stop in to see me in the Education Department, Room 9, Wright Hall Basement, or call me to dicuss this matter.

If I don't hear from you, I will call you in a week or so.

Thank you,

Renee Goldberg
Education Department
793-7293 (Clark)
755-6305 (Home)

## PARTICIPANT CONSENT FORM

(To be signed after researcher explains the study to the prospective subject.)

I understand that participation in the study is voluntary and that I may withdraw my participation at any time once the study is in progress. I will receive a $20.00 stipend when my participation in the study is finished.

I understand that the study under consideration is about learning styles, learning problems and learning disabilities of college students. I agree to participate in the study, which will include:

1. an interview
2. an individual intelligence test
3. a learning style test
4. a language test
5. a reading test

I will also submit some written work and a time log, as explained. I authorize the researcher to obtain my current grade point average. I believe my grade point average is/is not above 3.0.

To preserve my privacy and confidentiality, all my participation in the study will be coded with the identification number ______.

Date ______________________

Student Signature ______________________

TO: Students in Renee Goldberg's Study

SUBJECT: Additional Testing Dates

DATE: October 26, 1981

Group Testing Dates for Renee Goldberg's Study have been scheduled. You should attend a Session 1 and a Session 2.

Either session may be first - choose the time most convenient for you. If you don't attend these testing sessions, you will be contacted for other times.

**Those people who were tested Oct. 22 have already completed Session 1. Just choose a time for Session 2.**

| | | | |
|---|---|---|---|
| Session 2 | Wed. Oct. 28 | 7-9 p.m. | Wright Hall Basement Seminar Room |
| Session 1 | Sat. Oct. 31 | 1-3 p.m. | " |
| Session 2 | Sun. Nov. 1 | 1-3 p.m. | " |
| Session 1 | Mon. Nov. 2 | 3-5 p.m. | Jonas Clark Room 220 |
| Session 1 | Wed. Nov. 3 | 7-9 p.m. | Wright Hall Basement Seminar Room |
| Session 2 | Sat. Nov. 6 | 1-3 p.m. | " |
| Session 2 | Thurs. Nov. 11 | 7-9 p.m. | " |
| Session 1 | Fri. Nov. 13 | 1-3 p.m. | " |
| Session 1 | Wed. Nov. 18 | 7-9 p.m. | " |

TO: Students in Renee Goldberg's Study

FROM: Renee Goldberg, Education

DATE: November 13, 1981

Here are several pieces of information concerning this study.

1. Paper & Exam

Please see that I get a copy of a paper and an essay-type exam. Or, give me the originals, and I will copy and return to you.

2. Testing Place

If you have not completed your group testing, additional dates are available. You should attend a Session 1 and a Session 2. You will receive a listing of additional dates in the next few days.

3. Time Log

Please complete the attached time log for the week of November 16. Return it to me in the Education Department.

4. Payment

I am submitting slips to payroll as you finish the testing. You will recieve a check in your box.

5. Discussion of Results

If you want to discuss the test results, make an appointment to see me at the end of this semester or at the beginning of Semester 2.

Thank you.

TO: Students in Renee Goldberg's Study
SUBJECT: Additional Testing Dates
DATE: November 13, 1981

Additional testing dates for group testing have been scheduled. If you haven't completed the group testing, you should attend a Session 1 and a Session 2. Please indicate the session you plan on attending by returning the bottom form to me or by signing up on the sign-up sheets in my office. Room, Education Department.

Thank you

| | | | |
|---|---|---|---|
| Session 2 | Tuesday, November 17, 1981 | 3-5 pm | J.C. 115 |
| Session 1 | Wednesday, November 18 | 7-9 pm | Wright Hall Basement Seminar Room |
| Session 2 | Thursday, November 19 | 7-9 pm | " |

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HAPPY THANKSGIVING

*************************

| | | | |
|---|---|---|---|
| Session 1 | Tuesday, December 1 | 7-9 pm | Estabrook 302 |
| Session 2 | Wednesday, December 2 | 8-10 pm | Wright Hall Basement Seminar Room |

************************************************************

I will attend (please check one of each session 1 and session 2):

| | | | |
|---|---|---|---|
| _____ | Session 2 - Tues, Nov. 17 | 3-5 pm | J.C. 115 |
| _____ | Session 1 - Wed., Nov. 18 | 7-9 pm | Wright Hall Basement Seminar Room |
| _____ | Session 2 - Thurs. Nov. 19 | 7-9 pm | " |

*************************

HAPPY THANKSGIVING

*************************

| | | | |
|---|---|---|---|
| _____ | Session 1 - Tues, Dec. 1 | 7-9 pm | Estabrook 302 |
| _____ | Session 2 - Wed., Dec. 2 | 8-10 pm | Wright Hall Basement Seminar Room |

Return to:
Renee Goldberg, Educ. Dept. Your Name ______________________

TO: Subjects in Renee Goldberg's Study

FROM: Renee Goldberg, Education Dept.

DATE: January 15, 1982

## HAPPY NEW YEAR AND WELCOME BACK

If you would like $20.00 to buy books, pay debts, play Pac-man, etc., please finish the testing for my study!

Group Testing Dates for any unfinished group testing are:

| | | |
|---|---|---|
| Monday, January 18, 1982 | 1-3 p.m. | JC 215 |
| Tuesday, January 19, | 7-9 p.m. | Wright Hall Basement Seminar Room |
| Wednesday, January 20, | 7-9 p.m. | " |

You need to complete the testing or turn in the following items as indicated:

_____ Individual Testing (IQ test, interview)

_____ Group Testing, Session 1

_____ Group Testing, Session 2

_____ Individual language test (to be arranged with Debbie Allen and Ann Leoleis - 653-7845)

_____ Time Log (if you haven't done it, a new one is attached)

_____ Copy of paper

_____ Copy of in-class essay exam

_____ Consent Form

Contact me if any questions, problems, concerns!!!!

TO: Students in Renee Goldberg's Study

FROM: Renee Goldberg, Ann Leoleis, Debbie Allen

DATE: January 22, 1982

PLEASE finish up your testing for the study!

We will be available SATURDAY, JANUARY 30, from 10 a.m. to 4 p.m. in the Education Department, Wright Hall Basement, to do any kind of testing (except the intelligence test) that you have left. If you cannot make this time, call Ann or Debbie (753-7845) to arrange times.

*********************************************

Your $20.00 will not be paid until the tests are finished.

*********************************************

Thank you. See you soon.

TO: Students in research study

FROM: Renee Goldberg, Education Department

DATE: February 2, 1982

*************************************************************

You have already earned $10.00 for your participation in my research study. I can't pay you until you finish your testing. So, if you'd like the $20.00 we agreed upon, please finish what we began.

You need to spend ________ hours to finish up.

To make it convenient for you, Renee Goldberg will be available in the Education Department, Wright Hall Basement, for testing during these times:

| | |
|---|---|
| Wednesday, February 3, 1982 | 1:30 - 4:00 p.m. |
| Friday, February 5, 1982 | 9:00 a.m. - noon |
| Saturday, February 6, 1982 | 1 - 4 p.m. |
| Monday, February 8, 1982 | 9:30 a.m. - 3 p.m. |

If you can't come then, call or stop in my office to make arrangements.

Renee Goldberg Work 793-7293 or Home 755-6305

Ann Leoleis, Debbie Allen - 753-7845

TO: Participants in Research Study

FROM: Renee Goldberg, Education Depart.

DATE: March 22, 1982

Your testing is completed. However, I still need the following from you:

- time log (new one enclosed if you haven't done it already)
- paper
- exam

If you're interested in the results and haven't seen me already, please contact me.

And please, get the missing items in!!!

Thank you.

April 13

Another friendly reminder!! I'm still missing the following pieces of information I need for my study. Please, Please, Please drop them off or call me if you have questions.

P
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THANK YOU.

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Renee Goldberg
Room 9, Education Dept.
793-7293 (Clark)
755-6305 (Home-evenings)

PLEASE!

I still need your:

- time log (new one enclosed if you haven't done it)
- paper
- exam (in class, essay-type)

PLEASE!!

*(I will return the papers and exams to your box.)*

# APPENDIX F

## JOAN AXELROD

Research Assistant

OFFICE:

North Shore children's Hospital
Medical-Educational Evaluation
Center
57 Highland Avenue
Salem, Massachusetts 01970
(617) 745-2100, Ext. 227

HOME:

11 Follen Street
Boston, Massachusetts
02116
(617) 424-1231

### EDUCATION

| | | |
|---|---|---|
| Ed.D. | Candidate | Clark University, Department of Education, Worcester, MA. |
| M.Ed. | 1978 | Boston University, Department of Special Education, Boston, MA. Thesis Topic - Re-viewing the Diagnostic Process with Special Needs Children. |
| B.A. | 1970 | Clark University, Worcester, MA. |

### PROFESSIONAL EXPERIENCE

| | |
|---|---|
| 1976 - Present | Psychoeducational Diagnostician, North Shore Children's Hospital, Salem, MA. |
| 1980 - Present | Instructor (part-time) Clark University, Worcester, MA. Course taught: Seminar in Special Education. |
| 1977 - 1980 | Instructor (part-time) Wheelock College/ Graduate School, Boston, MA. Course taught: Learning Disorder, Evaluation of Young Child. |
| 1975 - 1976 | Psychoeducational Specialist, Lynn Hospital, Neuropsychology Lab, Lynn, MA. |
| 1971 - 1975 | Child Care Worker/Assistant Director, Wellington Hall, Robert F. Kennedy Action Corps, Lancaster, MA. |

## PROFESSIONAL EXPERIENCE (continued)

| | |
|---|---|
| 1972 - 1973 | Student Teacher, Walker School, Needham, MA. |

## PROFESSIONAL AFFILIATIONS

American Educational Research Association

Association for Children With Learning Disabilities

Orton Society

## PUBLICATIONS

| | |
|---|---|
| Bush, R. and Axelrod J. | "Hyperactivity and Learning Disabilities." In R. Bush (Ed.), *A Parents Guide to Child Therapy*, New York: Delacorte Press, 1980. |
| Axlerod, J. and Haller, J.S. | "Acquired Aphasia with Convulsive Disorder: A Case Study," (in preparation). |

## WORKSHOPS

Invited workshop presented at North Carolina Association for Children with Learning Disabilities, State Conference, Greensboro, North Carolina, 1978.

"Writing the Individualized Education Program: Translating Test Information into an Education Plan." Workshop presented at the Association for Children with Learning Disabilities 15th International Conference, Kansas City, Kansas, 1978.

"Developing a Diagnostic Test Battery for Secondary School Children." Workshop presented at Symposium for Children, Waltham, Massachusetts, 1977.

# LYNN A. HALLBACK

Research Assistant

## EDUCATION

| | |
|---|---|
| 1972 | Cornell University<br>B.A. Psychology and Sociology |
| 1977 | University of Hartford<br>M.A . Clinical Psychology |
| 1979 | Doctoral student, Department of Education, 2nd year student, started September 1979 |

## PROFESSIONAL EXPERIENCES

| | |
|---|---|
| Sept. 1972 to Dec. 1972 | Coordinator, Clark University Women's Center, Worcester, MA. |
| June 1972 to Aug. 1973 | Counselor, Montachusett Neighborhood Youth Corps, Fitchburg, MA. |
| Sept. 1973 to Aug. 1975 | Research Associate, Eagleville Hospital and Rehabilitation Center, Department of Research and Evaluation, Eagleville, PA. |
| Feb. 1976 to Present | Staff Psychologist, Harrington Mental Health Clinic Child and Family Team, Southbridge, MA. |

## SUPERVISED TRAINING EXPERIENCES

| | |
|---|---|
| Feb. 1976 to April 1977 | Clinical Internship, Harrington Mental Health Clinic, Southbridge, MA. |

# MARTHA WALLY

248 Burncoat Street
Worcester, MA 01606
Phone: 853-3584

## EDUCATIONAL PREPARATION

| College | Degree | Major |
|---|---|---|
| Assumption College | CAGS | Social & Rehabilitation Counseling |
| Assumption College | M.A. | Social & Rehabilitation Counseling |
| Worcester State College | B.S. | Education |

## WORK EXPERIENCE

1. School Psychologist - 2-80 to Present

   Head Start Child Development Program
   Worcester Public Schools, Federal Program
   Worcester, MA

2. School Psychologist - 10-78 to 2-80

   University of Massachusetts Medical School
   Worcester, MA

3. School Psychologist, Consultant - 9-77 to 10-78

   Douglas Public Schools
   Douglas, MA

4. School Psychologist, Consultant - 9-76 to 6-78

   Millbury Public Schools
   Milibury, MA

5. Psychoeducational Consultant - Summer, 1978

   Hubbard Regional Hospital
   Mass Department of Mental Health
   Webster, MA

WORK EXPERIENCE (continued)

6. Guidance Counselor - 2-74 to 5-75

Worcester Public Schools
Worcester, MA

7. Rehabilitation Counselor - 9-71 to 2-74

Central Massachusetts Rehabilitation Center
Worcesters, MA

# GERTRUDE M. WEBB

Ed.D. CONSULTANT

## PERSONAL

Residence: 105 Edgewater Drive, Waltham, Massachusetts. Telephones: (617) 893-1250 and 6250.

Family: Wife of J. Chester Webb; Mother of: Harrison E. Webb; Sarah M. Webb-Rosen; Marc E. Webb; Deborah J. Webb Eisenbach; Samuel L. Webb, II; Heidi-Rachel Webb.

## EDUCATION

Boston College, Ed.D. (with highest distinction), 1976; Boston State College and Harvard University, M. Sc. Ed., 1962; Boston Teachers' College, B. Sc. Ed., 1937; Girls' Latin School (Boston), Secondary Diploma, 1933.

## PROFESSIONAL CERTIFICATIONS

Massachusetts Department of Education certifications: School Psychologist; Guidance Counselor; Administrator of Public Schools; Second History and English; Elementary classroom teacher.

## EMPLOYMENT

Professor of Education and Director of Learning Center at Curry College, Milton, Massachusetts, 1969-present; Staff Psychologist and Consujltant to Pediatrics Department of Carney Hospital at Boston, 1975-present; Instructor in Child Psychology at Lasell Junior College, Newton, Massachusetts, kindergarten through sixth grade, group and individual tutoring "the hard-to-reach-and-teach," 1956-1960; Waltham and Boston school systems special-assignment classroom teaching at elementary and secondary level, 1937-1943.

## PROFESSIONAL AFFILIATIONS

Phi Delta Kappa, Boston College Chapter; Council for Exceptional Children (CEC); International Federation for the Learning Disabled (IFLD); Orton Society.

## PUBLICATIONS

1977 THE NATUILUS: AN IDEAL ELEMENTARY SCHOOL - "The Common" published by New England Teacher Education Magazine.

1977 ANALYSIS OF 243 CHILDREN WITH LEARNING DISABILITIES Robert P. Younes, M.D. and Gertrude M. Webb, Ed.D. Available through U.S. Department of Health, Education and Welfare, Education Research Information Center (ERIC) Clearinghouse on Handicapped and Gifted Children.

1977 WEBB-CURRY SURVEY OF ATTITUDES TOWARD GIFTED AND TALENTED published by Curry College, Milton, Massachusetts 02186.

1976 WEBB-CURRY LEARNING ASSESSMENT published by Curry College, Milton, Massachusetts 02186.

1976 LEARNING DISABILITIES--UNIQUELY AMERICAN OR CROSS-CULTURAL? An in-depth study of random samples of American and British children's reading and language development, learning potentials and achievements six months after entering first grade - published by Boston College Graduate School of Arts and Sciences, Boston, Massachusetts.

1974 NEUROLOGICALLY HANDICAPPED YOUTH GO TO COLLEGE - Chapter XII of "Handbook on Learning Disabilities" - Edited by Robert Weber, Published by Prentice Hall, New Jersey.

1972 BUILDING OF SELF-WORTH - "Academic Therapy" published by Academic Therapy Publishing Company, San Rafael, California.

1971 DEVELOPING A SELF-CONCEPT - "Massachusetts School Board Journal," published by Massachusetts Association of School Committees, Boston, Massachusetts.

1970 EDUCATING THE LEARING DISABLED - "California School Board Journal," published by California School Board Association, California.

1968 FEDERAL FUNDING FOR EDUCATING THE LEARNING DISABLED AND SUMMER PROGRAMS IN MASSACHUSETTS - published by Massachusetts Association of School Committees Journal, Boston, Massachusetts.

## PUBLICATIONS (Continued)

1964 PHILOSOPHY OF SCHOOL COMMITTEES - "TRENDS" - published by University of Massachusetts, Department of Education, Amherst, Massachusetts.

## IN-SERVICE TRAINING SEMINARS, ETC.

1980 PSYCHO-EDUCATIONAL ASSESSMENT OF LEARNING DISABLED ADOLESCENTS . . . Massachusetts Rehabilitation Commission, Boston, Massachusetts

1980 COLLEGE FOR LEARNING DISABLED STUDENTS . . . National Association of Children With Learning Disabilities, Milwaukee, Wisconsin

1979 MEETING THE SOCIO/EMOTIONAL, VOCATIONAL AND ACADEMIC NEEDS OF THE LEARNING DISABLED ADOLESCENT . . . Massachusetts Association for Children with Learning Disabilities, Sturbridge, Massachusetts

1979 CHAPTER 766 vs AVERAGE AND GIFTED . . . Massachusetts Association of School Committees, Harwich, Massachusetts

1979 THE LEARNING DISABLED MAKE IT AT COLLEGE . . . New England Reading Association 31st Annual Confernece, Hartford, Connecticut

1979 COLLEGE FOR WHICH LEARNING DISABLED? . . . Massachusetts Association for Children with Learning Disabilities, Boston, Massachusetts.

1979 MEETING THE NEEDS OF THE COLLEGE-ABLE DYSLEXIC . . . Burlington Community College, New Jersey . . . New Jersey Learning Disability Specialits Annual Meeting

1978 GIFTED AND TALENTED--ORGANIZING COMMUNITY SUPPORT . . . A seminar conducted a the North Shore Conference for Gifted and Academically Talented Students under the sponsorship of Ipswich School Department, Ipswich, Massachusetts

1978 WHAT MUSIC EDUCATION CAN DO FOR THE TALENTED AND GIFTED . . . Seminar conducted at the All State Conference for Massachusetts Music Educators at University of Massachusetts, Amherst, Massachusetts

IN-SERVICE TRAINING SEMINARS, ETC. (Continued)

THE GIFTED LEARNING DISABLED STUDENT . . . In-service seminar conducted for Teachers and Parents, Melrose School Department, Melrose, Massachusetts

LEARNING DISABILITIES--UNIQUELY AMERICAN OR CROSS-CULTURE? . . . Seminar conducted at Council for Exceptional Children Annual Conference, Kansas City, Missouri and at the World Conference on Special Education, Stirling, Scotland

THE GIFTED AND TALENTED - DEFINITION AND APPROPRIATE SERVICING . . . A seminar conducted at Annual Conference of Massachusetts Association of Superintendents and School Committees, Hyannis, Massachusetts

THE GIFTED AND TALENTED--WHO ARE THEY IN YOUR CLASSROOM? . . . In-service seminar series of lectures and consultant services for faculty and administrators of the Medfield School Department, Medfield, Massachusetts

SYLVIA FLEISCH
11 Garrison Road
Brookline, MA

Consultant

## Educational Background

| | | |
|---|---|---|
| 1938 | B.S. in Education | Bridgewater State College |
| 1945 | M.Ed. | Boston University |
| 1956 | Course work beyond M.Ed. (33 hours) | Boston University |

## Professional Experience

| | |
|---|---|
| 1938-40 | Teacher, Acushnet, Massachusetts Public Schools |
| 1951-52 | Teacher of English, The Rehovat Gymnasium, Israel |
| 1952-55 | Teacher of Mathematics and General Science, Barnstable, Massachusets High School |
| 1956-61 | Assistant to the Director, Boston University Computing Center |
| 1957-64 | Lecturer in Statistics, School of Education, Boston University |
| 1963-76 | Lecturer in Data Processing, Metropolitan College, Boston University |
| 1961-81 | Assistant Director, Boston University Computing Center, Boston, MA. |
| 1973- | Research Affilitate in Epidemiology, Forsyth Dental Center |
| 1981- | Consultant in Data Processing |

## Memberships

American Statistical Association
Pi Lambda Theta

## Selected Publications

Alman, J.E., Fleisch, S. and Lisanti, V. Estimation of Examiner Error in Caries Diagnosis for Clinical Trials. J. Dent. Res. 40: 745, 1961.

Glass, R.L., Alman, J.E. and Fleisch, S. Punch Card Method of Coding and Recording Student Clinical Achievement, J. Dent. Educ. 29: 260-265, 1965.

Fleisch, S., Alman, J.E. and Glass, R.L. Analysis of Examiner Consistency in Clinical Trials. Int. Assn. Dent. Res. 1968, Program of Abstracts, number 252.

Glass, R.L., Alman, J.E. and Fleisch, S. Computer Assisted Record Systems for Clinical Projects, pp. 1-15, Computer Applications in Dental Education, U.S.P.H.S., San Francisco, 1969.

Glass, R.L., Alman, J.E., Fleisch, S. and D'Agostino, R.B. The Appropriateness of Analysis of Variance to the Statistical Analysis of Dental Clinical Trials. Arch. Oral Biol. 17: 633-643, 1972.

Warner, S.B., Jr. and Fleisch, S. Measurements for Social History: Metropolitan America 1860-1960. Monography. Sage Publications, Inc. (In Press)

## Boston University Computing Center Publications

Fleisch, S. User's Guide to Statistical Program Library. Fourth Edition, September, 1975.

Fleisch, S. and Satow, Y. RASS - Conversational Statistical Package, February, 1976.

# APPENDIX G

## Grade Point Average of Sample Subgroups

Good Academic Performance
LD Group (N=28)

| | GPA | Frequency |
|---|---|---|
| Highest | 3.67 | 1 |
| Highest | 3.57 | 1 |
| Highest | 3.56 | 1 |
| Highest | 3.49 | 1 |
| Highest | 3.48 | 1 |
| Highest | 3.36 | 1 |
| Highest | 3.35 | 1 |
| Highest | 3.33 | 1 |
| Highest | 3.24 | 1 |
| Highest | 3.23 | 2 |
| Highest | 3.18 | 1 |
| Highest | 3.15 | 1 |
| Highest | 3.11 | 1 |
| Highest | 3.10 | 2 |
| Highest | 3.04 | 1 |
| Highest | 3.02 | 1 |
| Highest | 2.98 | 1 |
| | 2.94 | 1 |
| | 2.93 | 1 |
| | 2.91 | 2 |
| | 2.90 | 1 |
| | 2.89 | 3 |
| | 2.87 | 1 |

Mean = 3.15
SD = .24

Highest = Highest Academic Performance LD Group (N=19)

Mean = 3.27
SD = .20

Poor Academic Performance
LD Group (N=29)

| | GPA | Frequency |
|---|---|---|
| | 2.85 | 2 |
| | 2.84 | 1 |
| | 2.83 | 3 |
| | 2.78 | 1 |
| | 2.76 | 1 |
| | 2.72 | 1 |
| | 2.71 | 2 |
| Lowest | 2.68 | 3 |
| Lowest | 2.67 | 1 |
| Lowest | 2.65 | 1 |
| Lowest | 2.64 | 1 |
| Lowest | 2.61 | 2 |
| Lowest | 2.53 | 1 |
| Lowest | 2.43 | 1 |
| Lowest | 2.40 | 1 |
| Lowest | 2.39 | 1 |
| Lowest | 2.27 | 1 |
| Lowest | 2.22 | 1 |
| Lowest | 2.07 | 1 |
| Lowest | 2.00 | 1 |
| Lowest | 1.94 | 1 |
| Lowest | 1.63 | 1 |

Mean = 2.55
SD = .31

Lowest = Lowest Academic Performance LD Group (N=18)

Mean = 2.39
SD = .31

## Grade Point Average of Sample Subgroups

Good Academic Performance
ControlGroup (N=14)

Mean GPA = 3.21, SD = .46

| GPA | Frequency |
|---|---|
| 3.60 | 1 |
| 3.58 | 1 |
| 3.55 | 1 |
| 3.47 | 1 |
| 3.33 | 1 |
| 3.25 | 1 |
| 3.17 | 1 |
| 3.14 | 1 |
| 3.10 | 1 |
| 3.05 | 1 |
| 3.00 | 1 |
| 2.98 | 1 |
| 2.96 | 1 |
| 2.86 | 1 |

Poor Academic Performance
Control Group (N=10)

Mean GPA = 2.34, SD = .30

| GPA | Frequency |
|---|---|
| 2.78 | 1 |
| 2.75 | 1 |
| 2.69 | 1 |
| 2.60 | 1 |
| 2.59 | 1 |
| 2.51 | 1 |
| 2.43 | 1 |
| 2.20 | 1 |
| 2.05 | 1 |
| 1.91 | 1 |

## Table 16a

## Standard Deviations on Psychoeducational Assessments for LD and Control Groups

| Variable | LD SD | Control SD |
|---|---|---|
| WAIS-R Overall IQ | 11.53 | 10.07 |
| WAIS-R Verbal IQ | 11.39 | 8.30 |
| WAIS-R Perf. IQ | 13.95 | 12.80 |
| WAIS-R Diff V/P IQ | 9.65 | 7.19 |
| WAIS-R Scatter Score | 1.80 | 1.68 |
| WAIS-R Information | 2.16 | 1.47 |
| WAIS-R Digit Span | 2.16 | 1.91 |
| WAIS-R Vocabulary | 1.91 | 1.11 |
| WAIS-R Arithmetic | 2.45 | 1.69 |
| WAIS-R Comprehension | 2.84 | 2.28 |
| WAIS-R Similarities | 2.31 | 1.77 |
| WAIS-R Picture Completion | 2.47 | 1.89 |
| WAIS-R Picture Arrangement | 2.58 | 2.40 |
| WAIS-R Block Design | 2.60 | 2.38 |
| WAIS-R Object Assembly | 3.13 | 2.63 |
| WAIS-R Digit Symbol | 2.51 | 2.15 |
| WAIS-R Bannatyne Spatial | 2.26 | 1.87 |
| WAIS-R Bannatyne Sequencing | 1.43 | 1.33 |
| WAIS-R Bannatyne Verbal Conc. | 7.98 | 2.01 |
| WAIS-R Bannatyne Acq. Know. | 1.61 | .89 |
| WAIS-R ACID | 1.28 | 1.03 |

Table 16a (continued)

| Variable | LD SD | Control SD |
|---|---|---|
| WAIS-R Memory | 1.63 | 1.18 |
| Bender Score | .80 | .34 |
| TOAL ALQ | 16.56 | 12.56 |
| TOAL Listening | 22.39 | 19.77 |
| TOAL Speaking | 16.36 | 13.87 |
| TOAL Reading | 15.06 | 16.38 |
| TOAL Writing | 19.32 | 19.90 |
| TOAL Spoken Language | 18.80 | 12.46 |
| TOAL Written Language | 16.55 | 14.20 |
| TOAL Vocabulary | 17.12 | 13.65 |
| TOAL Grammar | 19.09 | 13.29 |
| TOAL Receptive Language | 17.98 | 15.28 |
| TOAL Expressive Language | 16.52 | 12.39 |
| WRAT Spelling | 10.11 | 8.25 |
| WRAT Math | 12.15 | 15.02 |
| Gates Vocab. | 14.27 | 10.94 |
| Gates Comp. | 14.34 | 12.79 |
| Gates Overall | 12.66 | 9.70 |

## Table 17a

Standard Deviations on Psychoeducational Assessments of Good and Poor Academic Performance LD Groups

| Variable | Good Academic Perf. LD | Poor Academic Perf. LD |
|---|---|---|
| WAIS-R Overall IQ | 11.96 | 11.26 |
| WAIS-R Verbal IQ | 11.92 | 10.76 |
| WAIS-R Perf. IQ | 14.57 | 13.58 |
| WAIS-R Diff. V/P IQ | 11.57 | 7.39 |
| WAIS-R Scatter Score | 1.87 | 1.74 |
| WAIS-R Information | 2.14 | 2.14 |
| WAIS-R Digit Span | 2.17 | 2.13 |
| WAIS-R Vocabulary | 1.63 | 2.19 |
| WAIS-R Arithmetic | 2.48 | 2.44 |
| WAIS-R Comprehension | 2.90 | 2.80 |
| WAIS-R Similarities | 2.50 | 2.12 |
| WAIS-R Picture Completion | 2.92 | 1.97 |
| WAIS-R Picture Arrangement | 2.36 | 2.82 |
| WAIS-R Block Design | 2.64 | 2.60 |
| WAIS-R Object Assembly | 3.22 | 3.09 |
| WAIS-R Digit Symbol | 2.64 | 2.34 |
| WAIS-R Bannatyne Spatial | 2.39 | 2.17 |
| WAIS-R Bannatyne Sequencing | 1.44 | 1.41 |
| WAIS-R Bannatyne Verbal Comp. | 2.01 | 1.95 |
| WAIS-R Bannatyne Acq. Know. | 1.61 | 1.52 |
| WAIS-R ACID | 1.33 | 1.14 |

Table 17a (continued)

| Variable | Good Academic Perf. LD | Poor Academic Perf. LD |
|---|---|---|
| WAIS-R Memory | 1.80 | 1.47 |
| Bender Score | .83 | .79 |
| TOAL ALQ | 17.54 | 15.81 |
| TOAL Listening | 20.96 | 23.38 |
| TOAL Speaking | 18.35 | 14.68 |
| TOAL Reading | 17.25 | 13.09 |
| TOAL Writing | 20.15 | 18.60 |
| TOAL Spoken Language | 19.89 | 18.00 |
| TOAL Written Language | 17.36 | 16.08 |
| TOAL Vocabulary | 16.86 | 17.53 |
| TOAL Grammar | 21.26 | 17.17 |
| TOAL Receptive Language | 15.28 | 19.89 |
| TOAL Expressive Language | 17.82 | 15.56 |
| WRAT Spelling | 9.50 | 10.38 |
| WRAT Math | 12.14 | 12.22 |
| Gates Vocab. | 12.99 | 14.79 |
| Gates Comp. | 15.04 | 13.18 |
| Gates Overall | 11.97 | 12.27 |

### Table 18a

### Standard Deviations on Psychoeducational Assessments for Highest and Lowest Academic Performance LD Groups

| Variable | Highest SD | Lowest SD |
|---|---|---|
| WAIS-R Overall IQ | 12.67 | 11.44 |
| WAIS-R Verbal IQ | 11.85 | 12.28 |
| WAIS-R Perf. IQ | 16.28 | 12.36 |
| WAIS-R Diff V/P IQ | 12.28 | 7.74 |
| WAIS-R Scatter Score | 1.70 | 1.75 |
| WAIS-R Information | 2.26 | 2.14 |
| WAIS-R Digit Span | 1.92 | 1.64 |
| WAIS-R Vocabulary | 1.79 | 2.22 |
| WAIS-R Arithmetic | 2.34 | 2.53 |
| WAIS-R Comprehension | 3.01 | 2.90 |
| WAIS-R Similarities | 2.45 | 1.96 |
| WAIS-R Picture Completion | 3.10 | 2.17 |
| WAIS-R Picture Arrangement | 2.67 | 2.87 |
| WAIS-R Block Design | 2.97 | 1.98 |
| WAIS-R Object Assembly | 3.49 | 3.12 |
| WAIS-R Digit Symbol | 2.82 | 2.40 |
| WAIS-R Bannatyne Spatial | 2.67 | 2.04 |
| WAIS-R Bannatyne Sequencing | 1.60 | 1.27 |
| WAIS-R Bannatyne Verbal Conc. | 2.12 | 1.98 |
| WAIS-R Bannatyne Acq. Know. | 1.74 | 1.80 |
| WAIS-R ACID | 1.42 | 1.18 |

Table 18a (continued)

| Variable | Highest SD | Lowest SD |
|---|---|---|
| WAIS-R Memory | 2.04 | 1.08 |
| Bender Score | .96 | .92 |
| TOAL ALQ | 16.70 | 15.11 |
| TOAL Listening | 22.77 | 21.27 |
| TOAL Speaking | 16.14 | 17.35 |
| TOAL Reading | 17.92 | 12.83 |
| TOAL Writing | 19.10 | 17.68 |
| TOAL Spoken Language | 17.39 | 18.21 |
| TOAL Written Language | 17.02 | 15.12 |
| TOAL Vocabulary | 15.54 | 17.06 |
| TOAL Grammar | 22.24 | 16.44 |
| TOAL Receptive Language | 19.04 | 16.57 |
| TOAL Expressive Language | 16.42 | 15.82 |
| WRAT Spelling | 10.90 | 10.65 |
| WRAT Math | 12.06 | 14.07 |
| Gates Vocab. | 12.67 | 14.29 |
| Gates Comp. | 15.98 | 12.79 |
| Gates Overall | 11.98 | 11.52 |